

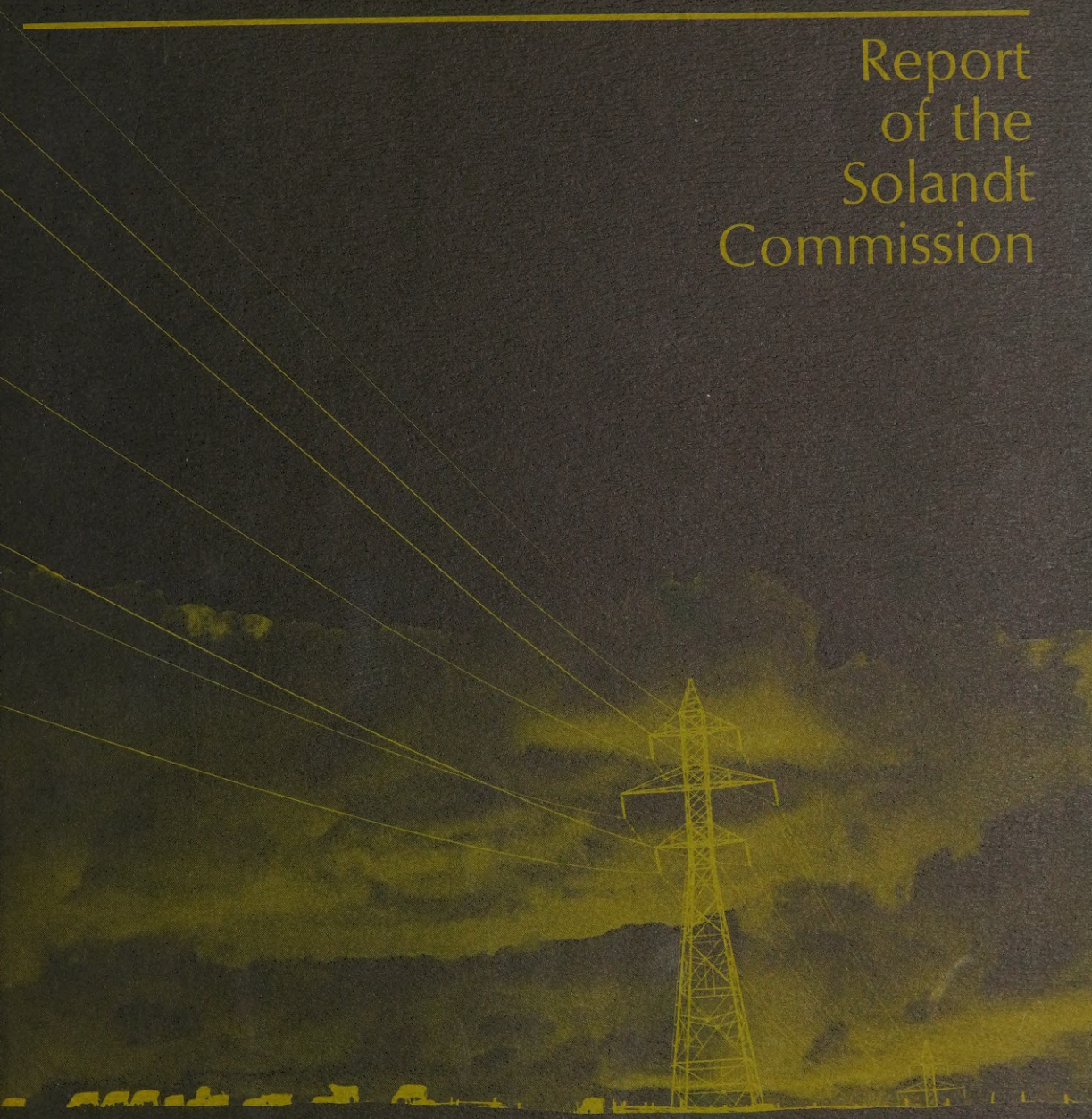
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Report of the Solandt Commission



"Transmission"

A public inquiry
into the
transmission of power
between
Lennox and Oshawa



Solandt
Commission

416/965-1431

Ferguson Block
9th Floor
Queen's Park
Toronto Ontario

April 1975

The Honourable Allan Grossman
Provincial Secretary
for Resources Development
The Government of Ontario

Dear Mr. Grossman:

As a Commissioner of Inquiry, appointed by Order-in-Council OC-836/73, dated the 21st day of March, 1973, pursuant to the provisions of the Public Inquiries Act, 1971, to inquire into and make recommendations on the transmission of power between Lennox and Oshawa, I am pleased to submit to you the following Report of the Commission.

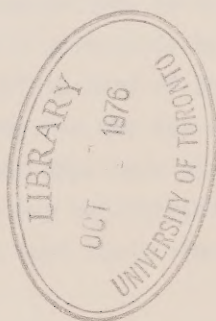
Yours sincerely,

Omond Solandt

Omond M. Solandt
Commissioner

Report of the Solandt Commission

A public inquiry into the transmission of power
between Lennox and Oshawa
April 1975



Preface

In these hearings, the Commission has been faced by many difficult choices. The area to be traversed by the 500 kV transmission lines between the Lennox Generating Station and the Oshawa Area Transformer Station offers the possibility of many routes of widely differing characteristics. These pass through areas that vary from bare rock and scrub forest on the Laurentian Shield, to land of high agricultural soil capability, to an active utility corridor near Lake Ontario. Several of the suggested routes seem to be environmentally, socially and technically acceptable. Each potential route was stoutly opposed by at least one ministry, municipality, planning group, local citizen organization or by individual citizens. The choice of routes is so large and the pros and cons are so varied that there is no single selection that stands out as the best or even as the worst. The characteristics of the routes differ so much that objective criteria are not decisive and so personal value judgments must inevitably have a substantial effect on the final selection. In an attempt to reduce the effect of my own biases, I have tried to give equal weight to views expressed in presentations before the Commission. As a result, I propose a route which I personally believe to be the best and which I know will commend itself to many of those who have studied the alternatives. I hope that everyone who has contributed toward the work of the Commission will feel that they have played a useful part in its deliberations. Even those who may be adversely affected by the final selection can at least be assured that their views have been heard and carefully weighed.

Summary of Principal Recommendations

- 1) The Commission accepts the need for 500 kV connections between the Lennox, Wesleyville and proposed Darlington Generating Stations and the proposed Oshawa Area Transformer Station.
- 2) The route recommended by the Commission for these 500 kV lines is shown in detail on Map 3, page 117. The route proceeds north from the Lennox Generating Station to Mount Pleasant Junction, near Highway 401, within a right-of-way already acquired by Ontario Hydro. It then follows the route described in the Ontario Hydro/Commonwealth Associates Inc. report¹ which, after crossing Highway 401, turns west crossing the Moira River just north of Corbyville and the Trent River just south of Batawa and continues to a point near Osaca in Hope Township. In Hope Township the Commission route² turns south to enter the site of the Wesleyville Generating Station. This segment of the route consists of 2 double-circuit 500 kV lines within a 425 foot right-of-way.

From the Wesleyville Generating Station, the Commission route continues west, just south of Highway 401, to the site of the proposed Darlington Generating Station. This segment of the route consists initially of 2 double-circuit 500 kV lines within a 425 foot right-of-way.

From the Darlington Generating Station site north to the Oshawa Area Transformer Station, the Commission route follows the egress route recommended in the OH/CAI report. Here three double-circuit 500 kV lines will be contained in a 600 foot right-of-way.

-
- 1 Hereafter referred to as the OH/CAI report. Commonwealth Associates Inc. is a firm of environmental consultants that was retained by Ontario Hydro to study the route.
 - 2 Since so many routes have been "recommended", "preferred" or "selected", this route will, to avoid ambiguity, be called the "Commission" route.

- 3) The Commission supports the OH/CAI recommendation that the proposed Oshawa Area Transformer Station be located in Concession VII of Darlington Township, at its western boundary.
- 4) The OH/CAI report includes provision of right-of-way for enough tower lines to incorporate into the 500 kV system a second generating station at each of the three sites (Lennox, Wesleyville and Darlington). Since there will be an interval of several years between the completion of one generating station at each site and the beginning of the construction of the next, the lines that are initially constructed need only provide for one station at each site. Nonetheless, the Commission supports Ontario Hydro's recommendation that it be permitted at this time to buy or reserve by covenant with the landowner the additional right-of-way required for the future 500 kV line (page 138). If the Commission route is adopted, the additional right-of-way required is for one additional double-circuit 500 kV line occupying an additional 175 foot width for 14 miles between the Wesleyville and Darlington Generating Stations.

The OH/CAI report also recommends that for a distance of approximately one mile north from both the Wesleyville and Darlington Generating Stations, to a point where the egress lines cross an existing east-west 115 kV line, the 500 kV rights-of-way be widened to provide for the inclusion of 230 kV lines should these be required in the future to supply local demand. For this short distance, this will widen the right-of-way north from the Wesleyville Generating Station to 555 feet and from the Darlington Generating Station to 730 feet. The Commission also supports this recommendation.

- 5) Ontario Hydro's guidelines for the use of "improved appearance" single shaft steel poles instead of lattice towers suggest the use of steel poles for most, if not all, of the distance between the Wesleyville and Darlington Generating Stations and where the egress lines from these stations cross Highway 401. The Commission recommends that these guidelines be followed and steel poles be used for

this distance of about 15 miles. Lattice towers are recommended for the remainder of the Commission route.

- 6) The Commission recommends that Ontario Hydro, in conjunction with government agencies and appropriate public organizations, arrange to set up some organization with appropriate local offices along the route where a landowner can call and get speedy action on complaints and difficulties.

Acknowledgements

The Commissioner's first and most sincere acknowledgement goes to each person who presented a written or oral brief or joined in the discussion at the hearings. Without exception, everyone seemed to share the view that we were collectively seeking to find the "least worst" solution to a problem that cannot have a completely satisfactory outcome. Everyone was frank, objective and even humorous at times. The emotions that occasionally showed through, were genuine expressions of feeling and were respected by everyone.

The Honourable Allan Grossman, Provincial Secretary for Resources Development, has ensured the complete independence of the Commission and encouraged it in its task. The Deputy Provincial Secretary, Mr. G.H.U. Bayly and his staff have done an excellent job of providing the support so essential to a temporary Commission.

As in the earlier hearings, the Commission has continued to depend on a small, loyal and often grossly overworked staff. Neil Cole, as Secretary, guided the Commission through most of the hearings until his resignation in August 1974, and returned briefly to help with the final preparation of the report. Linda White, who had been the Commission's Administrative Officer until August 1974, took over then as Secretary and did double duty throughout the later hearings and the preparation of the report. Paulette Apostolov, Phyllis Claremont and Sandra Sutton have in turn coped effectively with the very difficult task of doing all the typing and clerical work for the Commission. To all of them go my most sincere personal thanks for the great job that they have done.

James Shantora continued as Commission Counsel. His role during these hearings has been less active than in the previous ones because of the excellent pattern that he set for the proceedings of the Commission.

Tom Sparling was retained as a consultant to help in the consideration of alternative routes at the western end of the study area. He remained to help with the analysis of information and the preparation of the report.

The first presentation by Commonwealth Associates Inc. of their report to the Commission was made by a team which was led by Ralph Hubbard and included Larry Hartman, team co-ordinator, Tina Beyer and Fred Bohl. In this early presentation, they were supported by members of the staff of Ontario Hydro who took on the continuing task of answering questions and supplying information at successive hearings. In this they were led by their counsel, James Southey and Bruce Campbell, who completely avoided the traditional adversary situation of the courtroom and thus made a major contribution to the positive and friendly atmosphere of the hearings. The list of Ontario Hydro officers who contributed to the work of the Commission is a very long one. I hope that they will accept the grateful thanks of the Commission and not feel slighted if I select a few for special mention.

John Sedgwick became "Mr. Hydro" for purposes of the hearings. His encyclopaedic knowledge of the area and its inhabitants and of the technology involved was the indispensable catalyst that kept the work of the Commission going smoothly. He usually knew the answers and if he didn't, he knew exactly where to get them. In addition, he nearly always knew the questioner and the background of his or her question so well that little explanation was needed. He was the right man in the right place at the right time and for this the Commissioner is most grateful.

Others from Ontario Hydro who made a major contribution were Bev Pearson who helped to guide the Commission through the intricacies of system planning, Neil McMurtrie who spoke convincingly on property problems, Tom Griffiths who ably presented Ontario Hydro's practices on right-of-way management from the environmental point of view and, last but by no

means least, John Dobson who organized and guided the entire relationship between the Commission and Ontario Hydro.

One of the most reassuring developments of this series of hearings was the large part played by the many ministries of the Ontario government, are listed in Appendix J. The Ministries of Agriculture and Food, the Environment and Natural Resources took a very active part in the hearings. The contributions of David Birnbaum and Dan Shatil of the Ministry of the Environment were particularly valuable.

Most of the affected municipalities made useful written submissions to the Commission (Appendix J). In addition, both elected officers and municipal and planning officials appeared and contributed effectively to the discussions. Mayor Garnet Rickard of the Town of Newcastle was doubly helpful, both as a farmer and as the elected head of the municipality most affected by the proposed route.

The agricultural community did a splendid job of portraying their reasons for objecting to transmission lines on farms. In this they were ably led by Ray Cunningham, Bruce Taylor and others from the Ontario Federation of Agriculture and Gary Henry and Don Welsh who spoke effectively for the Durham County Federation of Agriculture. Others made an important contribution by organizing and speaking for a variety of local groups of concerned citizens, many of whom were farmers. Among these were Mary McEwen who organized and spoke for the citizens of the Council for the United Townships, Bill Langstaff who spoke for the residents of Sidney Township and Borden Forsythe and Ivan May who spoke for the Hastings County Federation of Agriculture. The presentations of the Durham and Northumberland Flue Cured Tobacco Growers' Association given by Messrs. Lambier, Sinclair and Frew, were concise, informative and helpful.

Apart from the Commission staff and Ontario Hydro for whom the hearings were part of their job, the sessions were composed of a hard core of about 20 people who were nearly always present both to listen and to contribute to the discussion. I want to assure each one of them

that their presence and their contribution was greatly appreciated by the Commission. At risk of offending others, I will select a few for special mention. Obviously, at the head of the list should come Peter Giles who proposed a 401 route, a variant of which is recommended by the Commission in this report. Peter Cox of Thurlow Township Residents' Committee did some serious field work in order to recommend another crossing of the Moira River and a modified route leading to and from this crossing. Paul Rolfe presented a very carefully thought out brief. Ruth Titcombe contributed a nostalgic and philosophic slant to the discussions.

Special thanks are due to the members of the Ganaraska Panel whose contributions are described on page 125. Bob Hodgins of the Ganaraska Region Conservation Authority was particularly helpful in contributing to discussions on the Ganaraska Forest.

Press, radio and television did a great job in covering the public meetings and in reporting proceedings and discussions. They were a major link in the mechanism for communication between the Commission and the public. Their efforts added substantially to the quality and effectiveness of the Commission's interaction with the public. In these days when the media are so often criticized for sensationalism, it is reassuring to report that they did a thoroughly responsible, honest and intelligent job in their coverage of a very important but not spectacular issue.

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PHOTOS

- Courtesy of:
- Cover - Ontario Hydro
 - Public Participation - Ontario Hydro
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INTRODUCTION

Ontario Hydro provides electrical energy to the citizens of Ontario. Its service area encompasses approximately 250 thousand square miles with a population of almost 8 million. About $2\frac{1}{2}$ million customers are served either directly or through 353 municipal electric utilities. Over the past decade Ontario's Gross Provincial Product increased by 73%; electric power consumption over the same period grew by about 100%. The long term rate of growth of the Ontario Hydro system has been remarkably constant for more than 50 years, with total consumption doubling every 10 to 11 years. In 1973 the peak power demand was about 13,600 megawatts.³ By 1980 it is expected to reach 22,000 megawatts.

Ontario Hydro must continually expand both its generating capacity and its transmission system to meet this steadily increasing demand by Ontario consumers while maintaining an acceptable level of reliability.

The time that elapses between the identification of the need for a new generating station and delivery of power from it is at least 10 years. Therefore, Ontario Hydro must continually forecast the future. In the past this has been done quietly and effectively, with little public attention. Ontario Hydro has made its own forecasts of both the location and size of growing demand and has planned generating stations and transmission lines to meet these forecasts. The plans were discussed with provincial and municipal governments and with locally concerned landowners. There were no broad general public discussions because the public had not expressed any concern or interest. The situation has changed rapidly in the last three years. Individual citizens and organized groups have now begun to take a lively interest in proposals for new development and have insisted on an opportunity to discuss any proposals which are likely to have major effects on the environment, on the general pattern of land use or on their own property. The public has also begun to doubt the wisdom of "experts" and of the "establishment" and has, consequently, insisted on questioning every element of the plans of

3 megawatt = 1 thousand kilowatts = 1 million watts and is abbreviated as 1 MW.

agencies such as Ontario Hydro. It was this new and highly desirable interest on the part of the public that led to the appointment of the Solandt Commission by Order-in-Council "pursuant to the provisions of the Public Inquiries Act, 1971" on the 21st of June, 1974, "to inquire into the transmission of power from Nanticoke to Pickering". On the 21st of March, 1973, the terms of reference of the Commission were extended to include an examination of the proposed route of Ontario Hydro's transmission facilities between Lennox and Oshawa. Since the terms of reference for this inquiry were quite specific, they are here reproduced verbatim:

The Honourable the Provincial Secretary for Resources Development recommends that the said terms of reference of the Solandt Commission be extended as follows:

- (i) to inquire into the most appropriate route or routes for the transmission of power to the Toronto load centre from Ontario Hydro's existing Lennox Generating Station and proposed stations at Wesleyville and Bowmanville.⁴ This study will include the entire area between Napanee and Oshawa, and will give particular consideration to social and environmental as well as economic factors.
- (ii) in the achievement of the foregoing the Commission should, following public submission to the Commission of the Ontario Hydro report resulting from the studies of this area presently being undertaken by Ontario Hydro and Commonwealth Associates, Inc., and which involve

4 When Ontario Hydro sought to acquire a site for a generating station in the Bowmanville area, the station was tentatively called "Bowmanville Generating Station". When the proposal was presented to the Darlington Township Council on May 21st, 1971, the Council agreed with Ontario Hydro's proposal to acquire the site but asked that the name of the generating station be changed from the Bowmanville Generating Station to the Darlington Generating Station. Because of this preference the station was called the Darlington Generating Station throughout the OH/CAI report and in all the deliberations of the Commission. However, the reader should be quite clear that the Darlington Generating Station and the Bowmanville Generating Station are synonymous and refer to the one site located on the lakeshore just west of Bowmanville.

public participation, provide full opportunity for all interested individuals and organizations to discuss their views with the Commission. To ensure the attainment of this objective, the Commission should at that time invite written briefs and hold public hearings, under the terms of the Public Inquiries Act.

(iii) further, but not to the exclusion of other matters, the Commission is to study and make recommendations on:

- the design of surface installations such as towers, transforming stations, etc.;
- policies for multiple use of the transmission corridor;
- ecological practices for maintaining the transmission corridor;
- alternative methods for determining the routing of future transmission corridors; and
- other policies, such as land use planning, which might have a bearing on future routings of transmission corridors.⁵

These terms of reference were modified by a statement made in July 1974 by the Honourable Darcy McKeough, then Minister of Energy. He announced the Government of Ontario's approval for Ontario Hydro to proceed with the construction of the Wesleyville Generating Station and work has now begun on that site. The Minister also stated that he was accepting the advice of the Ontario Energy Board to defer a decision on construction of the Darlington Generating Station. He further announced the public release of Ontario Hydro's long range plan for generating stations and transmission lines for the period 1983 to 1993. These long range plans will be the subject of extensive public hearings over the next two years. He also asked that the Solandt Commission should as far as possible take into account the impact of these long range proposals on the siting of the Lennox to Oshawa transmission lines.

The elements of Ontario Hydro's long range plan that have a bearing on the choice of route for the Lennox to Oshawa transmission line include:

5 Order-in-Council # OC-836/73, dated March 21st, 1973.

the planning and construction of a generating station on the Darlington site; the possibility of the construction of another generating station, designated in Ontario Hydro's long range plan as "Central Lake Ontario", which would be located on the lakeshore between Cobourg and Brighton; the construction of 500 kV⁶ transmission lines from the Lennox Generating Station to Ottawa and Cornwall and, finally, the future need for a connection which would by-pass the Oshawa Area Transformer Station from this group of lakeshore generating stations to the Toronto load centre. The bearing of each of these on the selection of the route will be considered at appropriate places in this report.

In an ideal world a study such as the one outlined in these terms of reference would be only one element in a much larger study. In this ideal world Ontario Hydro would already have presented a complete outline of all its plans for the next 20 or 30 years. These would then be fully discussed by the public and co-ordinated with all other projected land use plans before any specific projects were approved. Unfortunately, no detailed long range land use plan for Ontario yet exists. Both the rate and the location of growth in population and industry are uncertain so Ontario Hydro must guide its expansion by a series of plans that begin as concepts and become more and more precisely defined as the time for construction approaches. As a result, the problems associated with the evolution of any major element in a plan such as the Lennox to Oshawa transmission route are rather like the happenings of a TV serial; the reader of this report may well feel as confused as a person who sees only one isolated episode.

A good many people who participated in the public hearings had this feeling and suggested that a decision on the Lennox to Oshawa route should be put off for several years until Ontario Hydro's long range plans could be fully discussed. Unfortunately, such a position is not tenable. The Lennox Generating Station is almost complete. The demand for the power from Lennox increases as time marches inexorably on. If we

⁶ kV = kilovolt = 1,000 volts.

stop the process now, just as in the case of the TV serial, we run the risk of leaving a significant number of Ontario Hydro customers in the dark. To reduce the confusion that results from looking at this on-going process I shall begin by providing some background information that is essential to an understanding of the issues in this particular case.

Load Growth

Throughout this and previous hearings of the Solandt Commission the need for the expansion of the 500 kV system has been frequently questioned. The Commission has consistently taken the view that this problem is outside its terms of reference. However, there was obviously a need for a public discussion of the justification for new generating capacity. In July 1973, the Ontario Energy Board was given specific responsibility for examining and making recommendations on Ontario Hydro's forecast of power demand and of its plans for meeting this demand by new generating capacity. The Ontario Energy Board, in a report⁷ dated August 1974, to the Minister of Energy, supported Ontario Hydro's forecasts of power demand and recommended that generating capacity to meet them should be provided, but with some reduction in the reserve capacity that had been planned by Ontario Hydro. Since the review of Ontario Hydro's load growth predictions has been done by the Ontario Energy Board at public hearings, these predictions have been accepted for the purposes of this report and will not be further discussed here.

Even since the Ontario Energy Board report was received by the Ontario Minister of Energy there have been substantial changes in the energy situation throughout the world, in Canada and in Ontario. Strong pressure is being applied to everyone to reduce energy consumption or at least to re-

7 Ontario Energy Board, Report to the Minister of Energy, Ontario Hydro Power System Expansion Program and Financial Policies, August 1974.

duce the rate of increase of energy consumption. It might well be argued that these efforts will greatly reduce the rate of growth of the demand for electricity in Ontario Hydro's service area. Should a significant decline occur, Ontario Hydro could easily delay new construction even if approval had been obtained. However, some factors may well operate to prevent a decline or even to cause an increase in the rate of growth of electrical demand even when total energy requirements are declining: for example, a swing toward electrical heating in central business districts and other areas where pollution from the combustion of fossil fuels presents a problem and the possibility that the cost of electricity from nuclear power plants may rise less rapidly than from fossil fuelled plants. It would, therefore, seem to be very unwise for Ontario Hydro to plan now for any reduction in its load growth forecast.

Location of Generating Stations

Most of the economic hydro-electric generation sites in Ontario have been developed and load growth is now being met by the construction of large thermal-electric generating stations. Some of these will be so-called "fossil fuelled" stations burning either oil or coal; (the price and availability of natural gas are likely to be such that no new plants burning this fuel will be built); the majority will be nuclear power plants where the heat is derived from the fission of uranium. In all thermal generating stations, only 30 to 40% of the energy released from the fuel appears as electricity. The remainder appears as heat which must be dissipated. Where large quantities of cold water are available, as in the Great Lakes, the cheapest and easiest way of disposing of this heat is by use of lake water for cooling. As a result, Ontario Hydro's plans for the growth of generating capacity are based on a series of thermal power plants located on the shores of the Great Lakes. At each of the newer sites, enough land has been acquired to accommodate several successive plants or stations, each consisting of four or more units (footnote 9, page 8).

On the north shore of Lake Ontario three plants, Lakeview, Hearn and Pickering, are now operating; two more have been approved at Lennox and

Wesleyville; a third site is owned at Darlington (called Bowmanville in the above Order-in-Council) and a further site is to be sought in the Cobourg/Brighton area. The decision to use lake water for cooling thermal power plants is obviously a major factor in determining the location of Ontario Hydro's power generating stations and thus the layout of the entire transmission network. It was probably also an important factor in Ontario Hydro's decision to plan for a relatively small number of energy centres, each large enough to accommodate many units, rather than the alternative of having many separately located plants that might be located closer to load centres.

Bulk Power Transmission

Until relatively recently Ontario Hydro's bulk power transmission grid or network interconnecting generating stations and load centres has operated at 230 kV. With the predicted growth in power demand and the consequent need for transmitting increasing amounts of power, Ontario Hydro long ago began planning for higher voltage bulk power transmission. Transmission at higher voltage permits significantly more power to be delivered at less cost and with fewer lines. After careful analysis of the problem, Ontario Hydro chose 500 kV as the voltage for its new bulk transmission network.⁸

The first major element in this new network was a 500 kV transmission line constructed in 1965 from the Moose River area to Toronto. A second line has already been added along much of this route. The next new element will be the transmission lines from Nanticoke to Pickering, the subject of previous hearings held by the Solandt Commission. Plans were also made for a 500 kV connection near Milton between the Bruce Nuclear Generating Station and the Nanticoke to Pickering transmission right-of-way. Approval with some qualifications

⁸ Ontario Hydro gave evidence to support this selection at previous hearings of the Solandt Commission. In its earlier report the Commission agreed that the choice of 500 kV seemed to be a reasonable one so this question was not discussed at the present hearings.

has been given by the Government for the initial stages of these connections and construction will soon begin. The 500 kV transmission route from Lennox to Oshawa, which is the subject of this report, is another stage in the evolution of this 500 kV network.⁹

The characteristics of a high voltage transmission line are probably best understood by comparing them with those of other linear systems that are now competing for land. At present the only other linear systems that are being built in Southern Ontario are expressways and pipelines. Other high speed ground transportation systems on their own rights-of-way will almost certainly be added to this list in the not too distant future.

Major bulk power transmission systems differ in many ways from these other land uses. Probably the most obvious way is in the width of the right-of-way required. One double-circuit 500 kV line requires a right-of-way width of 250 feet. However, since the public has expressed a strong preference for ensuring that where possible multiple transmission lines be placed on a single right-of-way, 500 kV rights-of-way will usually be at least 425 feet wide (2 double-circuit lines) and may occasionally extend to more than 1,200 feet.

With rare exceptions, expressways are narrower than this and pipelines still narrower. However, unlike expressways, transmission lines create no physical barrier separating land on the two sides of the right-of-way. Except at the actual location of the towers all normal traffic, whether on roads, on farms, in woods or in open country, can easily pass back and forth under the lines. Moreover, the day is now passed when the right-of-way for a transmission line is clear cut and reserved solely for

9 For those who are interested in the system as a whole, further details of Ontario Hydro's future plans for the 500 kV transmission network are contained in their long range plan, Long Range Planning of the Electric Power System, which was made public in July 1974, and which will be the subject of future hearings.

the towers. Secondary uses of the right-of-way, including farming, are actively encouraged by Ontario Hydro. In some other countries, including England, buildings are permitted under transmission lines, provided the appropriate height restrictions are observed. This practice may be followed in Ontario in the future when land is more fully occupied.

Such an effect is very different from that of an expressway which creates a complete severance between land on the two sides of the right-of-way except where crossings, which are extremely expensive, are built. In addition an expressway creates substantial local noise and some atmospheric pollution. Noise from high voltage transmission lines is very small and from the available evidence atmospheric pollution, in this case by ozone, is negligible.

The various linear land uses also differ substantially in the secondary uses of the right-of-way that are permitted. Secondary uses of expressway rights-of-way are not common, though both pipelines and transmission lines can in theory sometimes be located with acceptable safety along the edge of an expressway right-of-way. Ordinary farm uses are generally permitted on a pipeline right-of-way and recreational use would seem to be possible. Forestry activities are not locally compatible with a pipeline. In contrast, Ontario Hydro's practices for the secondary uses are less restrictive and many secondary uses are both possible and permitted; but at present building is not permitted under transmission lines and all uses have height restrictions.

Up to this point transmission lines compare quite favourably with other land uses but their visibility weighs heavily against them. The other linear land uses with which a transmission line compares rise a comparatively few feet above the ground and so are only occasionally visible from a distance. In contrast, the 162 foot-towers of a 500 kV double-circuit transmission line are all too highly visible under many circumstances.

This comparison of features of linear land uses is summarized in Table I.

The comparisons are obviously very generalized but will help the reader to form a clearer picture of the characteristics of each system.

The Solandt Commission, Ontario Hydro, Commonwealth Associates Inc. and BHi Limited (the environmental consulting firm retained by the Commission during the study of the Nanticoke-Pickering 500 kV transmission lines) have, throughout their contacts with the public, found virtually complete agreement of public opinion on two issues related to transmission lines. The first is that where several parallel circuits¹⁰ are required to achieve the necessary capacity and security, these circuits should be put on as few towers as possible. In the case of a 500 kV line, a single circuit tower is about 120 feet high while a tower capable of carrying two circuits is 162 feet high. Even with this difference in height the public usually said they would prefer one two-circuit line rather than two single-circuit lines because of the reduced width of right-of-way required.

The second widespread, although not unanimous, public view was that where several lines of towers had to go between two points they should be kept side by side throughout the entire route, rather than running separately on different rights-of-way. Because of this public reaction, Ontario Hydro's proposal for the Lennox to Oshawa transmission lines has been based entirely on double-circuit 500 kV lines placed side by side in the same right-of-way. Where there is more than one line in the same right-of-way, the public favoured having the towers located in line abreast.

10 Large quantities of alternating current power are conventionally transmitted by a three-phase system. Each phase is carried on a separate conductor so that a complete circuit consists of three main conductors. A conductor is made up of four sub-conductors arranged in a square 20" on a side. Such an arrangement minimizes corona losses as well as radio and television interference.

Table I

Linear Land Uses

Comparison of Features

	500 kV Transmission Line	Pipeline	4 Lane Controlled Access Expressway	Railway
1. Right-of-way Width (Typical)	250' – 600'	60'	150' – 300'	60' – 100'
2. Effect as Physical Barrier	Minimal except at towers (every 900 feet)	Minimal	Yes	Yes
3. Secondary Uses of Right-of-way				
A. Farming	Yes	Yes	No	No
B. Forestry/Orchard	Yes (with 25' height restriction)	No	No	No
4. Local Noise	Not Serious	None (except at pumping stations)	Considerable (often serious)	Intermittent
5. Atmospheric Pollution	Negligible (ozone)	No	Yes	Intermittent
6. Visibility (at a distance)	162' high towers and lines, often visible at great distance	Limited and Local	Limited and Generally Local	Limited and Generally Local

The Lennox to Oshawa Route – History and Outline

In 1971 Ontario Hydro began an active search for a specific route for the Lennox to Oshawa connection and conducted an environmental study of the area. Five alternative routes were first identified and, after careful analysis of environmental and cost factors and discussions with local municipalities and interested citizen groups, Ontario Hydro selected one route as best meeting all requirements.

In the fall of 1972, in recognition of mounting public concern over environmental problems, Ontario Hydro withdrew its recommendation and retained the environmental consulting firm of Commonwealth Associates Inc. (CAI) to work with them in an entirely new public study to determine the preferred route between Lennox and Oshawa for the 500 kV transmission lines. This study resulted in a substantial report which recommended a preferred route (Map 1). The report¹¹ was presented to the Solandt Commission and was the subject of extensive public hearings. The present report outlines the results of these public hearings and the recommendations of the Commission which are based both on the OH/CAI report and on the public hearings.

As of March 1975, the first unit at the Lennox Generating Station is operating under test; the second should be in service in October 1975, the third in April 1976 and the fourth in October 1976. Work on the site for the construction of the Wesleyville Generating Station near Port Hope began in October 1974. When completed, the first stage of each of these two generating stations will comprise four units with a total capacity of 2,300 megawatts at each station. The first Wesleyville unit is scheduled to be in service in April 1979, and then another every six months thereafter to completion in 1980. The approval in

11 The report of the OH/CAI study consisted of three parts: the Environmental Report (main report), a Summary Report (a precis of the main report which was widely distributed) and a Technical Report, dealing with the study methods.

principle for the Darlington Generating Station has been given by the Government and will be the subject of a public participation program starting within the next few months. Approval from the Ministry of Energy is required before proceeding with construction.

The initial requirement for 500 kV transmission between Lennox and Oshawa is for two double-circuit tower lines, each initially carrying only one 500 kV circuit (a total of 2 circuits), connecting the Lennox Generating Station with the Oshawa Area Transformer Station. These two circuits are to be in service by early 1977 in order to incorporate the third and fourth units at the Lennox Generating Station into the system. The first two units at the Lennox Generating Station will be connected to the eastern part of Ontario Hydro's 230 kV system by two new lines already under construction from Lennox to Cataraqui. Although the initial requirement for the 500 kV transmission lines from Lennox to Oshawa is to transmit a portion of the station's output to the Toronto area, forecasts indicate that by the early 1980's these lines may be carrying a sizeable amount of power from the Toronto area to supply need in eastern Ontario.

The long range plan also provides for further expansion of the stations at Lennox, Wesleyville and Darlington. Each site might ultimately contain generating capacity up to about 12,000 megawatts but the present plan is not to build further capacity on any site until there has been time to observe environmental effects of the first plant. The route recommendations in the OH/CAI report include provision for enough circuits for one extra generating station at each of the three sites and will be discussed at appropriate points in this report.

The Solandt Commission Hearings

The hearings of the Solandt Commission on the Lennox-Oshawa route began with a Press Conference in Port Hope on April 2nd, 1974, when the OH/CAI report was presented to the Commission and to the public. On April 29th, 1974, there was a pre-hearing in Port Hope to discuss procedure for the hearings. On this occasion representatives of the agricultural community expressed strong opposition to the continuation of the hearings as planned because it would interfere so seriously with their seeding which was already running behind due to bad weather. The Commissioner agreed to consider these representations and to give a decision at the first formal hearing on Wednesday, May 8, 1974 in Port Hope. At this hearing it was announced that the further hearings would be postponed for two weeks and resume in Port Hope on May 22nd, 1974. Hearings were held in Port Hope on May 22nd, 23rd and 24th and on June 5, 1974. Hearings were held at Belleville on May 29th, 30th and 31st, 1974. Evening hearings were held at Hampton on June 3rd, Cold Springs on June 4th, Kendal on June 6th, Stockdale on June 11th and Honeywell Corners on June 12th, 1974. Further details of these meetings are given in Appendix H.

During the hearings in May and June 1974, the public who attended the sessions were mainly from the part of the study area adjacent to the OH/CAI preferred route and they consistently advocated more northerly routes.

The agricultural community, including the Provincial Ministry of Agriculture and Food, strongly advocated for the western half of the study area, a route which ran generally north of the agricultural lands, through the Ganaraska¹² Forest. Many others proposed that the route be moved out of the study area onto the Gatineau¹³ right-of-way.

In addition, a smaller number of the public advocated a more southerly route generally along Highway 401. One excellent and quite detailed

12 Ganaraska Route Alternative p. 55

13 Gatineau Route Alternative p. 50

proposal for a southerly route that would link the Wesleyville and the proposed Darlington Generating Stations by a line close to the lakeshore was presented by Mr. Peter Giles, a local resident.

Following the close of hearings in June 1974, I decided that some further study of these alternatives both north and south of the OH/CAI recommended route would be helpful. In announcing my decision to examine other routes I made it clear that I was not rejecting the OH/CAI recommended route but merely felt that the others should be given equally detailed study. Since I felt that all that was required was an amplification of the detail that OH/CAI had already collected on these routes, I decided to retain a competent consultant to assemble the needed information for presentation to the Commission when the public hearings were resumed. By the end of June, Mr. Tom Sparling had been retained by the Commission to undertake this task and he began work immediately. He has received constant support and assistance from Ontario Hydro, who already had available much of the information he required. The Commission asked Mr. Sparling to assemble factual information and as far as possible to avoid interpreting it. Ontario Hydro and CAI had no responsibility for Mr. Sparling's report and were invited to cross-examine him quite independently. When the Sparling report had been circulated to the public and submissions on it received, the Commission resumed its hearings.

Public hearings were held in Newcastle on November 6th and 7th, Kendal on November 13th and 14th, Newcastle on November 26th and Port Hope on November 27th, 1974. At the request of the Township of Thurlow and the Hastings County Federation of Agriculture a further local public hearing was held in Cannifton on January 20th, 1975.

The attendance at meetings with the exception of the one at Honeywell Corners was generally less than 70. At each meeting Ontario Hydro, usually supported by CAI, provided an excellent team to answer questions as they arose. The attendance by representatives of the municipalities was sparse but in general useful and effective. Many of the municipal representatives appeared with carefully thought out reactions to the proposed route and in some cases suggestions for alternatives.

The Ontario Federation of Agriculture, the Durham and Hastings County Federations of Agriculture, the Durham and Northumberland County Flue Cured Tobacco Growers' Association and other specialized groups representing the agricultural community presented very useful briefs and were represented at nearly all the hearings. None of the organized conservation groups were as active as in previous hearings, although the Sierra Club of Ontario did present both written and oral testimony that was of high quality and most helpful. The others in the audience at most of the meetings were local landowners who also made a major contribution to the hearings.

I make no attempt to summarize the points made and the views expressed at the public hearings. The purpose of the public hearings was to ensure that my selection of a route to recommend to the Government would be based on as comprehensive a knowledge as possible of the public reaction to the many alternative routes discussed. The results of this knowledge appear in my recommendations. In some cases the public views are mentioned explicitly but in many more cases are merely implicit in my recommendation. The next section contains some general comments on the nature of the public reaction to the prospect of the transmission route.

Public Reaction

Local landowners who gave either written or oral evidence to the Commission can be classified into three groups: the agricultural community, rural estate owners and residents of urban, suburban or rural strip developments.

The Agricultural Community

Farmers outnumbered all others and were most insistent that the transmission route should not traverse good agricultural land. Their principle argument against having the route cross land that was being actively farmed was that the towers would interfere very seriously with use of the land, whether for cultivated crops or grazing cattle. During the hearings evidence on this question was presented by many agriculturalists.

On the other hand, Ontario Hydro displayed pictures of all ordinary crops being cultivated under transmission lines. In addition, the Commissioner has personally seen examples on the Gatineau rights-of-way where a farmer has cultivated a crop even between the legs of towers.

During the hearings, representatives of Ontario Hydro sought to get agreement from the farmers as to the size of area around the tower base that could not be effectively cultivated. Using the largest figure that was supported, which was just over 1/10th of an acre per tower, Ontario Hydro calculated that the entire line would take out of cultivation about 112 acres. Judging by cultivation that the Commissioner has seen around tower bases, the actual amount lost would be considerably less.

On the other side of the argument is the undoubted fact that the erection of towers, especially in large fields, can cause substantial and costly inconvenience to a farmer. To make a generalized estimate of the monetary effect of this inconvenience is difficult because it will vary with the local situation. Ontario Hydro has indicated that their new land acquisition policies include an element intended to compensate for the inconvenience.¹²

The difficulty of manoeuvring large farm equipment around towers is by no means the only bad effect of a transmission line. During the construction of the towers, access to the construction site is required for relatively large and heavy vehicles including ready-mix concrete trucks. Both on the access roads and the construction site there will be more or less serious soil compaction and damage to tile drains. In addition, wherever excavations are made the soil disturbance and particularly the possible spreading of sub-soil over the top soil further interferes with crop growth. Even when these disturbances have been repaired and crops are again growing, the problem of weed control within the tower bases and in any uncultivated fringe area around them remains. Ontario Hydro's

12 Appendix A, N.J. McMurtrie, Property Policies and Practices of Ontario Hydro, Presentation to Solandt Commission, May 22, 1974.

plans for minimizing these ill effects are discussed on page 135. Even under the worst conditions the area taken out of cultivation during construction will only be a small fraction of the total area under the line.

Tobacco farmers made a compelling case that a power line over tobacco fields would prevent the use of two techniques not infrequently employed in the cultivation of tobacco, which are irrigation with high pressure water guns and the use of low flying aircraft for pest control and frost protection.

Ontario Hydro policy requires a minimum clearance of 15 feet between a 500 kV line and any object beneath it. Since on flat ground the distance from the ground to the lowest conductor at the maximum sag is 40 feet, this minimum clearance policy will only affect the operation of unusually large farm equipment.

The agricultural community almost unanimously expressed a preference to have the transmission line right-of-way along back lot lines or over an unopened road allowance, many of which exist in the area. They are strongly opposed to diagonal severances of farm fields. Where several lines cross a field the towers should, where possible, be in line abreast.

It has long been a tradition in many farming areas, including Southern Ontario, that the farm will provide for the farmer's old age. As population pressure increases he might count on selling part or all of his land for real estate development at a price well above the value of the land for agriculture. In areas where this possibility still exists or is even thought to exist, it is understandable that a farmer would wish to keep the transmission line right-of-way off his farm. It is obviously impossible to evaluate the importance of this factor among farm owners as a whole since the individual farmer can rarely foresee whether he will ultimately sell his farm for development or not but he is understandably anxious to keep the option open even if he has no present intention of exercising it. Since many parts of the study area are subject to development pressure, this factor was undoubtedly important.

Everything possible must be done to preserve Class 1 and 2 agricultural land in Southern Ontario since there is very little land anywhere in the world where such high agricultural capability is combined with such an excellent climate. However, even a superficial look at Southern Ontario reveals that the amount of good agricultural land taken out of agricultural use by high voltage transmission lines is trivial compared to the amount being used for industrial and residential development and highways.

Rural Estate Owners

Rural estate owners represent a relatively new group in the study area. They have mostly migrated from the city to seek a more peaceful rural environment. Many of them do some farming. Others reforest their property and in general do a good deal to improve the land that they buy. They tend to seek land with a view or near a stream. In this area, they do not seem yet to be a serious factor in taking agricultural land out of cultivation although their very presence in the area does to some extent interfere with farming. In some cases the land that they occupy has been severed from a working farm, thus reducing its area; they often own large dogs that roam the countryside and create a hazard for cattle and sheep; they not infrequently annoy the farmers by complaining of farm smells and noises; and by demanding improved roads and other services, their presence can lead to increased taxes. In short, the rural estate dweller is not completely compatible with the true farmer.

Many of them quite rightly argued that in opposing the construction of transmission lines, they are not merely seeking to defend their own property, but also to keep the right-of-way out of an area of obvious scenic beauty. The rural estate owner often advocated the use of natural features to conceal the tower lines from distant view. Since the best route for concealment is rarely straight, this desire almost inevitably conflicts with the farmers' antipathy to diagonal severances.

Residents of Urban, Suburban or Rural Strip Developments

In selecting their recommended route, Ontario Hydro and CAI avoided all groups of houses except on the north-south access route connecting the Darlington Generating Station with the east-west transmission route. In this connection several houses would have to be bought and demolished. The owners of these houses had very little to say at the hearings so it might be concluded that they would not be unwilling to move if compensation were adequate. However, there was strong opposition from developers who had plans for significant residential construction at several places along the OH/CAI preferred route.

Environmentalists

Many environmental organizations presented carefully prepared and useful briefs to the Commission. They are listed in Appendix H. In addition representatives of the Sierra Club of Ontario appeared on several occasions to give further testimony and to join in the discussions. The environmental point of view was also supported by the Ministries of Natural Resources, the Environment and by several concerned and well-informed individuals. With a few exceptions the environmental groups are not landowners in the area affected but have a genuine concern for the protection of the natural environment wherever it is threatened by new intrusions of civilization. In the study area they were most concerned to protect the headwaters of the short rivers that flow from north to south across the study area, the forested and reforested areas in the northern part of the area and a few swamps and other areas of special biological interest. Their case was ably presented and by inference was opposed to that of the farmers. Obviously, if the right-of-way is to be moved off agricultural land it must inevitably in some places lie on the areas that the environmentalists consider to be of particular importance and vice versa.

Public Participation

Solandt Commission Hearing, Newcastle, November 1974.



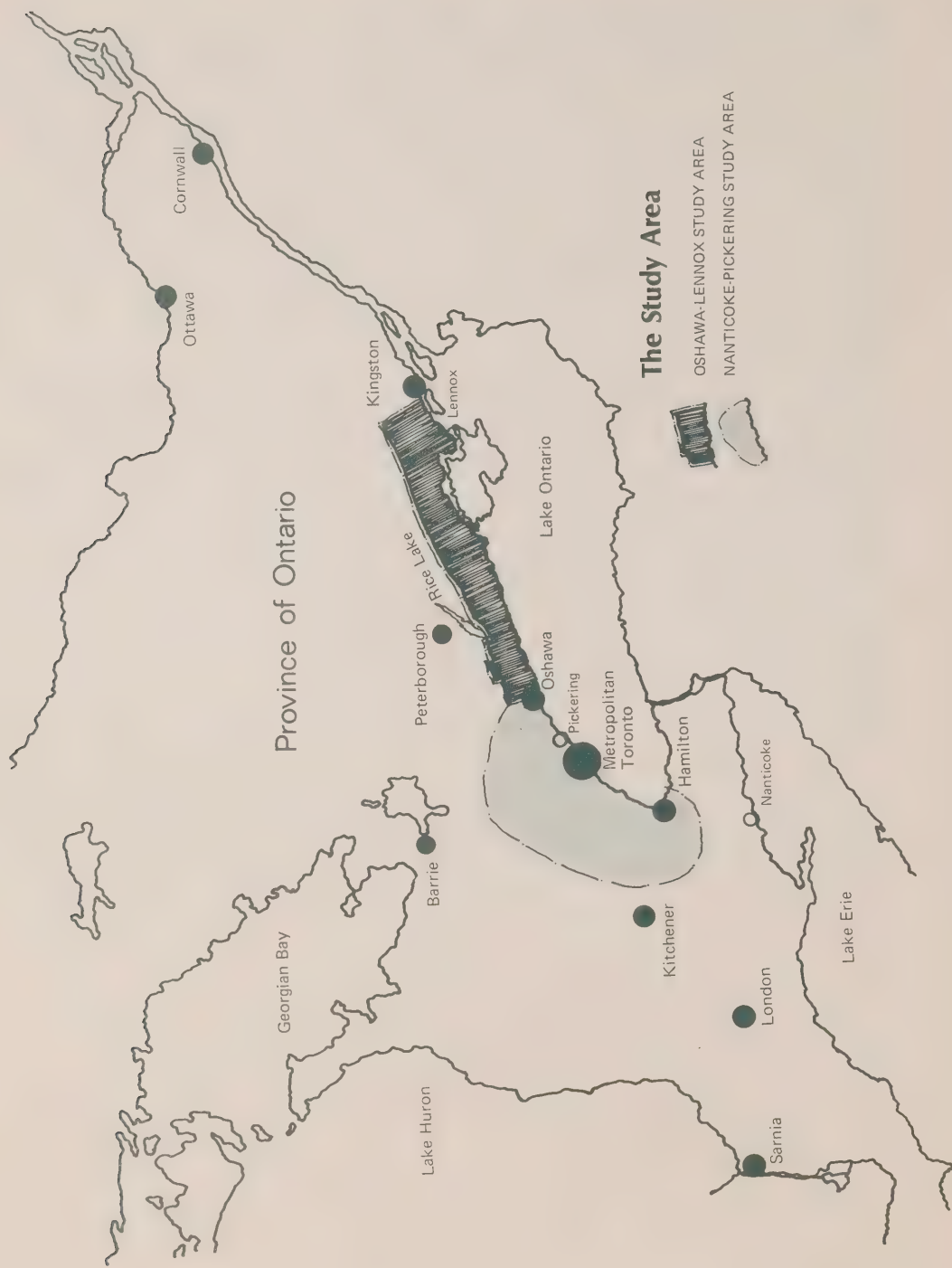
THE ONTARIO HYDRO/ COMMONWEALTH ASSOCIATES INC. STUDY

This section of the report is a brief summary of and commentary on the Ontario Hydro/Commonwealth Associates Inc. report. It is included here in order to make the present report intelligible without reference to the earlier report. However, anyone seeking to make a complete study of the subject should certainly read the original.

The Study Area

To ensure that all possibly suitable routes between Lennox and Oshawa were considered Ontario Hydro defined a study area of approximately 1,400 square miles. This area borders Lake Ontario for about 100 miles and extends approximately 10 to 16 miles inland. It includes parts of Ontario, Durham, Northumberland, Lennox and Addington and Hastings Counties. During the public meetings Ontario Hydro was urged to extend the study area farther north. This was done and as a result a possible route north into Manvers Township was included. A section was included in the report stating the reasons why the study area was not extended north of Rice Lake to include more of the existing Gatineau right-of-way.

In the north-western portion of the study area, the Oak Ridges Moraine, a series of sandy hills rising to about a thousand feet above sea level, provides major relief and is one of the prime areas for reforestation. The history of the area shows why conservationists and environmentalists are especially interested in these forests. The first woodlot planted under the free-tree program for farmers inaugurated by the Ontario Government in 1905 was in Darlington Township. In 1922 the Forestry Nursery of the Department of Lands and Forests was established at Orono. In 1924 one of the earliest county forests was established in Northumberland County followed a few years later by a similar forest in Durham County. When the Ganaraska River Conservation Authority was established in 1947, it began an extensive program of reforestation, particularly in blow sand areas. As a result, the whole area is now usually referred to as the Ganaraska Forest.



On the south slope of the Oak Ridges Moraine is a till plain, characterized by drumlins¹⁴ running in a northeast-southwest direction. The low-land bordering Lake Ontario is featured by till plains, drumlins and areas of silty deposits. From Newcastle to Trenton is a terraced area cut at intervals by deep stream valleys. Most of the woodland in the study area, other than the Ganaraska Forest, consists of scattered farm woodlots of various sizes and density together with a diversity of wet and dry scrub lands.

Most of the rivers and streams drain comparatively small areas. The Trent River system is the largest watershed draining 4,790 square miles and connecting Rice Lake and the Bay of Quinte. The largest of Durham County's rivers is the Ganaraska, 22 miles long and draining only 103 square miles but with a steep gradient. There are two other major watersheds: the Moira in Hastings County which drains 1,909 square miles and the Salmon in Lennox-Addington County, draining 350 square miles.

Lakes of importance are Biddy Lake in Cramahe Township, Oak Lake in Sidney Township and Rice Lake which forms the northern boundary of the study area in Hamilton Township.

"Most areas close to Lake Ontario show a population increase over the past decade. The largest growths have occurred near urban centres. Bowmanville, Port Hope and Cobourg influenced by development in the Oshawa-Metropolitan Toronto areas increased in population steadily. Trenton and Belleville to the east show smaller growth rates."¹⁵

The rural population dwells largely on individual farms or in scattered farm hamlets throughout the study area. There has also been a recent increase in the number of rural non-farm residents. Indeed, while much

14 A post-glacial land form characterized by its long oval mounded shape and usually found in series.

15 OH/CAI Summary Report, p. 11.

of the study area continues to be given over to agriculture, "Rural growth has [generally] resulted from an increase in rural residential population. . . . over 25 per cent of the farms in the western part of the study area are part-time or residential. Farms are fewer, but larger and more specialized."¹⁶ Area farming ranges from general agriculture to specialization in dairy, beef and tobacco. Taken as a whole, the study area has begun to reflect the pressures and demands of economic, and particularly urban growth, upon established rural and agricultural communities.

The OH/CAI Study Method

Commonwealth Associates Inc. were retained by Ontario Hydro to do an environmental study of the area between Lennox and Oshawa and to recommend a preferred route for the 500 kV transmission line through this area. Having had previous experience with a computer technique for transmission corridor selection, CAI elected to use a similar method again in this study. The method is briefly described in the main OH/CAI report and is more fully described in a companion volume to the main report which is entitled "Technical Report - Corridor Selection Methodology". This second volume has been available since the main report appeared but has not been widely circulated and probably not extensively read. Anyone interested in details of the method should consult both volumes.

The CAI method involves two phases. The first phase in which a computer was used resulted in printed maps upon which the corridors were selected visually. The second phase, or right-of-way selection, was done by more familiar methods using maps, air photos and ground and air reconnaissance. The following brief description of the method is mainly taken verbatim from the OH/CAI Summary Report and the Environmental Report.

PHASE I - CORRIDOR SELECTION

The objective of Phase I was the identification of several 750 metre wide alternative corridors. This task presented a formidable problem; for aside from environmental considerations, just the task of connecting two points in a geographic region has virtually an infinite number of possible

16 OH/CAI Summary Report, p. 11.

solutions. Therefore, a systematic procedure was utilized to limit the number of solutions to a manageable few and then evaluate each to determine the single best.

The corridor selection methodology was developed from the rational planning techniques commonly employed by urban and regional planners, and resource analysis methods. The main features of this hybrid combination are:

- Specification of a number of objectives necessary to the realization of the goal of establishing a minimum impact corridor;
- In-depth data collection by uniform cells located within a specific study area;
- Evaluation of the data to determine to what degree various locations in the study area respond to each objective;
- Generation of alternative corridor locations by differential emphasis of the objectives; and
- Evaluation of the alternatives in terms of the objectives and in terms of the political, social and economic considerations outside the process, but brought to it by the involvement¹⁷ of a multi-disciplinary group of individuals.

The method is based on a matrix with a list of selected objectives across the top and a list of variables relevant to each objective down the side. A new matrix is created to embody the special characteristics of each study area. Ontario Hydro and CAI prepared tentative lists of both objectives and variables based on their own experience and discussed these with the public at meetings in each township between February 8th and March 7th, 1974.

The objectives that were finally used in the computer study were:

17 OH/CAI Summary Report, p. 13.

- a) minimize damage to natural systems;
- b) minimize conflict with existing land uses;
- c) minimize conflict with proposed land uses;
- d) minimize conflict with culturally significant features;
- e) maximize potential for right-of-way sharing;
- g) minimize conflict with capability analysis (proposed transmission facility should avoid those areas of high land capability as designated by the Canada Land Inventory).

Objective f) was to minimize visual exposure but in the final analysis this was considered to be part of objective b).

The variables that were considered were topography, surface hydrology, existing land use, existing road ways, communications and utilities, proposed land use, unique features, outdoor recreation capabilities, average soil capability for agriculture and capability for water fowl.

Information on all variables was assembled for the entire study area. The next problem was to decide on the form in which this material would be fed into the computer. Computer programs which use mapping techniques and can deal with variable areas of any size and shape are in the process of development but are not yet widely used. A much more commonly used plan is to divide the entire area into small square cells and to tell the computer the value for each of the variables in each of these cells. Obviously, in the use of this type of computer analysis one of the most important decisions is the selection of cell-size. The ideal cell-size is so small that even small objects like houses or barns can be identified and coded. Unfortunately, the use of such a small cell-size would result in an impossibly large coding task so a compromise must be reached. In this case a cell-size of 250 metres square containing 15.45 acres per cell was chosen. Even at this size approximately 60,000 cells were required to cover the study area.

In using this method, all the inventory information available is transferred to maps. A grid of 250 metre square cells is then superimposed on each map. Each cell is then classified according to the variable being studied. In the simple case of major highways, for example, each cell either does or does not have a highway in it. There are no gradations. This means that, for this purpose, all highways become 250 metres wide. When all the inventory material has been coded, the computer digests this information and prints out maps for each variable. These are re-checked to be sure that no mistakes have been made. The remainder of the computer process is concisely described in the following quotation from the OH/CAI Environmental Report:

FORMULATE AND EXECUTE CORRIDOR SELECTION MODEL

Concurrent with the inventory, coding and mapping operations, the corridor selection model was developed. For each cell in the study area, this mathematical model translates the inventory variables relevant to each objective into a suitability score. This score ranges from one to five with the higher number expressing greater suitability for transmission corridor location.

The exact suitability value given to each variable within each objective was determined by a multi-disciplinary team of professionals using citizen input. The values established were expressed in the form of a computer program. This program processed each cell in the study area and prepared maps showing the spatial distribution of the suitability scores for each objective. In a similar manner, the objective scores for each cell were combined and mapped. These composite maps were prepared for each township by using the weights on each objective determined by the citizen of that township. In this way, the citizens of each township were able to express which objectives were most important to them.

SELECT CORRIDORS

The selection of alternative transmission corridors was accomplished with the aid of the objective and composite maps. The process basically consisted of a visual analysis of the spatial distribution of the suitability scores on the various maps. . . . the light shaded areas are

the more suitable. Corridors were formed on these maps by connecting clusters of lightly shaded (highly suitable) cells.¹⁸

Phase II right-of-way selection is concisely described in the same report:

The corridor selection methodology was designed to systematically evaluate the 1400 square mile study area and generate several alternative corridors. Since these corridors are necessarily generalized location, further in depth analysis is required. The right of way selection phase of the study concentrated on a detailed examination of the alternative corridors generated in Phase I.

Initially, the alternative corridors were plotted on Canadian Topographic Maps (scale 1:50,000), and an aerial photograph mosaic. In this process various problem areas were identified and marked for on-site investigation. A field inspection on all identified corridor alignments was carried out by two multi-disciplinary CAI teams to evaluate corridors for the required transmission facilities.

As a result of this inspection, several corridors were eliminated, as it was determined that the environmental constraints were too great.

Within each remaining alternative corridor, a right of way was plotted on 1973 aerial photographs at a scale of one inch equals 1320 feet and Canadian Topographic Maps (scale 1:50,000 and 1:25,000). Alternative rights of way were inspected on the ground and from the air, with adjustments for buildings, point natural features, farm fields, etc. to determine alignment. In all cases, attempts to minimize impact on the cultural and natural environment were foremost.

Upon determining right of way alignments, tabulations were prepared from 1973 aerial photographs and data recorded by cells in the corridor selection phase. They are presented by right of way segments in townships, in regions, and by route summaries.¹⁹

18 OH/CAI Environmental Report, p. 34.

19 OH/CAI Environmental Report, p. 36.

It is important to note that the more detailed tabulations were prepared from 1973 aerial photographs. Less detailed data from the computer print-outs is also included.

Those present at the OH/CAI public meetings were asked to rate each variable and each objective as Very Important, Quite Important, Important, Indifferent or Unimportant. For the analysis the replies were converted to a numerical scale ranging from 5 to 1. This scale of importance was then inverted into a scale of suitability ranging from 1 to 5.²⁰ On this scale, 1 is Very Unsuitable and 5 is Very Suitable.

In the case of the objectives there was such a spread in individual views that when averaged the range of importance between the different objectives was quite small (from 3.2 to 4.5). This means that the public input on objectives, although it was used unchanged in calculating weights, had little impact on the final result.

In the case of the variables public opinion was much more definite. For instance, cropland achieved a suitability rating of 1.3. This means that the public ranked it as being between "very unsuitable" and "quite unsuitable" for the construction of the 500 kV transmission line. In this case results obtained from the public were not used directly. "The exact suitability value given to each variable within each objective was determined by a multi-disciplinary team of professionals using citizen input."²¹ As shown in figure 4-B, page 31 of the OH/CAI Environmental Report, the multi-disciplinary team of professionals increased the suitability value of cropland from 1.3 to 4 thus rating cropland as "quite suitable" and in the same suitability category as woodland and as being more suitable for a transmission line than swamps, marshes, mines, quarries and gravel pits. This change might be justified on the grounds that the citizen sample was very small and heavily weighted by

20 OH/CAI Environmental Report, p. 220.

21 OH/CAI Environmental Report, p. 34.

farmers. However, the change should have been explicitly high-lighted in order to make it clear that the computer print-outs were weighted much more strongly in favour of running the transmission lines over cropland than the public in the area had supported. The significance of the arbitrary change in the weight given to cropland was not clearly recognized by the public since the computer print-outs were so unfamiliar to them that they did not really understand what had been done.

For reasons that are not obvious to me it would appear that their study of the computer print-outs led the analysts to discard both the more southerly corridor containing the route later suggested by Mr. Giles and the more northerly corridor which contains the route suggested by the Ministry of Agriculture and Food and supported by many farmers. As a result, the search for routes in these two areas must have been less complete than in the corridors that were selected from the study of the computer print-outs. My own brief study of the computer print-outs did not reveal any compelling reasons for excluding these two areas from more detailed consideration and therefore since there was considerable public pressure to examine both areas, I decided to resume the hearings of the Commission (see also p. 15.)

Being wise after the event, the Commission feels that CAI made a poor choice in selecting this computer method for this particular study. The most serious defect of the method is that it was not understood by the public; they instinctively mistrusted it but in general did not know why. In effect, the computer was programmed to look at the very detailed inventory maps with an eye that could see nothing less than 15 acres at a time and thus, to blur the details on the map. When this input was then weighted by suitability values for both objectives and variables, the result was a computer print-out that was thoroughly unfamiliar and not very intelligible to the layman.

In defence of the computer technique it must be pointed out that the use of the computer makes possible the production of maps showing the distribution of each variable adjusted for its suitability value and of combining any or all of these weighted variables into composite maps. This would be virtually impossible without a computer.

Nonetheless, I feel that the computer made a negative contribution to the entire OH/CAI/Solandt Commission proceedings. I have tried to explain my reasons for this conclusion, not in order to be critical of the contribution that any of the parties made to the study, but rather to try to ensure that the experience gained in this case is used to improve the application of computer technology in future studies of the kind.

Public Participation with Ontario Hydro and CAI

In this section, the public participation that was organized by Ontario Hydro and CAI during their study is described, largely by quotation from their report.

Even before retaining CAI to conduct an environmental study, Ontario Hydro had conducted many public meetings to discuss route selection.

Representatives of Ontario Hydro met with local municipal officials, as well as planning, conservation and citizen groups from early spring to mid-summer in 1972. Under discussion were a total of five routes, from as far north as Lime Lake and Percy Reach to Elizabethville and then south to Wesleyville to an extreme southerly alignment west from Lennox through Prince Edward County well south of Belleville, Trenton and Brighton, to Wesleyville. Ontario Hydro subsequently withdrew these proposed routes in favour of an entirely new public study by CAI.

With the active co-operation of Ontario Hydro, CAI included a further public participation program as an integral part of the route selection process.

Techniques were these:

1. An opinion survey of 508 residents carefully selected as representing a cross-section of the study area. Canadian Facts Co. Ltd. was retained by Ontario Hydro to conduct this preliminary survey.
2. A series of meetings with township officials, planning boards and Ontario Government Ministries.
3. Two rounds of public meetings involving, among other public participation techniques, the use of attitude questionnaires.

4. Extensive publicity including news releases, spot radio announcements and newspaper advertisements all designed to heighten public awareness of the planning stages related to the proposed transmission line.
5. Compilation of a mailing list to enable CAI/Hydro to keep interested citizens and organizations aware of new developments.
6. Public displays of visual study materials in libraries, municipal halls and schools.
7. Distribution of a mail-in corridor "preference ballot".
8. Availability of Hydro and CAI officials for meetings with special interest groups and individuals.

CANADIAN FACTS SURVEY

In the fall of 1972, Canadian Facts Co. Ltd. was retained by Hydro to conduct interviews with heads of households living in various parts of the study area. Purpose of the survey was to determine the general attitudes toward transmission lines - tower structures, right of way planning and tower location - of a representative section of area residents.

Of the 508 persons interviewed, most indicated that they preferred that the selected route avoid areas of human activity such as residential areas and recreational centres. Farmers put a high priority on the preservation of prime farmland. More than 40 per cent of the respondents said that Hydro should locate and construct the line in the most efficient way possible to avoid an increase in the cost of electrical service. Of those willing to accept an increase in electrical rates in return for greater environmental protection, most would not accept an increase of more than five per cent.

The majority favoured a narrower right of way with two taller towers over a wider right of way with three shorter towers.

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PUBLIC MEETINGS

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After two preliminary consultations with local officials, the first round of public meetings - ten in all - took place in February and March of 1973 in township halls and schools. These were general in scope, dealing with Hydro's need for the new facilities and public response to the project. They were well-advertised in advance, and proceedings were fully reported in the local media.

At these meetings, lists of environmental variables were distributed to the audience with members invited to list the variables (farmland, historic sites, residential areas, etc.) in order of their importance. Later tabulated, according to township, the results of this survey gave the project team a deeper insight into the environmental value system of local residents.

After the first series of meetings, an inventory of environmental data was completed, citizen input was tabulated, computer maps printed and field studies undertaken. After exhaustive analysis, alternative corridors were delineated. As several months would elapse before the next round of meetings, information kits were made available to the public. These provided information on all aspects of the project - the public participation process, Hydro's property acquisition policies, transmission line technology and construction and maintenance techniques for preserving the natural environment.

A second brochure, containing a map of alternative corridors and a "preference ballot" to be returned, was mailed. To reach those not on a rural delivery route, the "ballot" was printed as a double-page advertisement in local newspapers. At the same time, township officials and press representatives were invited to special meetings in Belleville and Port Hope to preview the alternative corridor selection.

On July 23, 1973, the second round of meetings was begun. The alternative corridors were described and public reaction to them was recorded. Suggestions for corridor modifications were encouraged along with recommendations for the location of the right of way within the corridors. Attendance at these meetings was considerably higher than at the earlier sessions, perhaps because residents now felt more deeply involved in the selection process.

RESULTS OF PUBLIC PARTICIPATION PROGRAM

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. . . At the Hampton meeting attended by residents of East Whitby, Darlington and Clarke townships, all the alternatives were rejected in favour of either a more northerly route or an alignment along Highway 401. At the request of those attending the Hampton meetings a subsequent round of four meetings took place in October and an expanded study area that included the southern portion of Cavan and Manvers townships was discussed. At these meetings Manvers residents expressed strong opposition to another major right of way in their township and contended that the additional cost that would be incurred by such a routing could not be justified by environmental considerations.

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Of concern to the planners was that even with the heavier attendance at the second series of meetings, only a comparatively few residents attended and the wishes of the greater community, the so-called "silent majority", were left unexpressed. In most cases, those who participated in meetings were concerned about their immediate locales rather than the study region as a whole - almost invariably they expressed preference for routes that were distant from their own homes.²¹

The OH/CAI Recommended Route

Ontario Hydro and CAI presented their final report recommending a route to the Solandt Commission on April 2nd, 1974. The Environmental Report is a large and comprehensive volume describing all aspects of the study. It is supported by a Technical Report, describing the computer-assisted method used for corridor selection. In order to make the present report self-contained the following brief outline of the OH/CAI recommended route is reproduced from the OH/CAI report, a map of their recommended route appears as Map 1, and explanatory diagrams on pages 44, 45 and 46.

21 OH/CAI Summary Report, p. 17-20.

ROUTE ANALYSIS

As was described in earlier chapters, the first task was to select broad corridors. As the study progressed, the best route was identified within each corridor. The recommended route combines sections from the alternative routes with several short connections over land outside the original corridors. In such a way, the recommended route takes advantage of the best features of the alternatives.

The recommended route was chosen for its ability to meet environmental criteria across the entire study area rather than in any one township. It should be judged as a whole and not in parts. It is not our intent to suggest that at every given point the recommended route is ideal: rather, that the route best meets the basic goals of the study while at the same time recognizing and satisfying, where possible, local concerns.

Trade-offs are necessary if the best over-all route is to be selected. The following township-by-township analysis of environmental and social factors should be viewed in this light. In some cases the recommended route may seem to favour one concern over another. As the route passes from one set of local conditions to another these concerns tend to balance out.

Mindful of the various interests at stake - preserving good farmland, conserving woodland, avoiding places of historical significance, etc. - there was one overriding principle: minimizing the disruption to residents, their homes and their places of business. Every consideration was given to this principle. The recommended route, therefore, is located across the less intensively developed parts of the study area, avoiding as far as possible the most settled areas and sections where intensive residential development is most likely to occur. Accordingly the route generally passes through rural areas.

This is not to suggest that rural concerns have been sacrificed. Throughout the study an attempt has been made to reduce to a minimum the impact of the transmission facilities on agriculture and natural resources. In assessing the impact on agricultural land both soil capability and present land use were taken into consideration.

Although the recommended route, in common with all of the alternatives, will cross farmland over most of its length, it is our belief that the line will not have much long-term impact on farm operations and will not result in a significant amount of land being permanently removed from production.

Water resources are protected, with rivers and streams crossed at their least vulnerable points. The route seeks to avoid established and proposed recreational and wildlife areas. Where such areas are traversed, crossing points have been selected that will minimize impact. Topographic variation is used, where possible, to provide a backdrop for the proposed tower line.

As has been stated many times it is impossible to fully satisfy everyone's goals in a study of this type. In many instances those goals conflict. The recommended route, of all of the alternatives examined, comes closest to satisfying the aims of the C.A.I./Hydro study.

Route Description

Moving from east to west, the recommended route (see map) begins at Mt. Pleasant Junction where the egress from Lennox GS terminates. [From Mount Pleasant Junction to Osaca there will be two parallel 500 kV lines.] It runs north about a mile, then turns west to run parallel to Highway 401 for five miles. It crosses the Salmon River at a point about a mile southwest of Lonsdale, then travels due west across the flatlands of Tyendinaga and Thurlow townships. It crosses Highway 37 just south [of] Honeywell Corners, then angles southwest across the Moira River and west into Sidney Township. In Sidney the route parallels the Trans Canada Pipeline for about six miles where it is partially screened by a series of hills.

The route crosses the Trent River at a narrow point, then moves into Murray Township where it bends to the northwest and runs between hills to a point southwest of Stockdale, near the Cold Creek. At this point the route turns west and passes north of the Codrington-Wooler County Road and moves into Brighton Township, crossing Highway 30 just to the north of the Codrington Fish Hatchery.

Touching the southern slope of Cramahe Hill the route continues west through Cramahe and into Haldimand Township, crossing the southern part of the Northumberland Forest Reserve. Backed by high land to the north it follows a valley across Hamilton Township and intersects Highway 28 just north of Rossmount. In Hope Township the route angles south, then west to a proposed switching station about five miles to the north of Wesleyville GS.

At the switching station the right of way widens to accommodate a third tower line. Passing about a mile to the north of Starkville, the route runs in a northwesterly direction across Clarke Township to a point just west of the Oshawa Ski Club. There it begins to parallel the Beauharnois 230 kV line into Darlington Township to a point just south of Tyrone. It then continues westward to a point about eight miles north of Darlington GS where the line joins the right of way out of the proposed generating station. From this point the right of way will provide for seven tower lines for a distance of some three miles to the proposed Oshawa Area Transformer Station. It is recommended that the station be located in the vicinity of the Darlington-East Whitby township line abutting the Gatineau right of way.²²

In addition to this description of the location of their recommended route, the OH/CAI report contains detailed information concerning the number of stations involved with the rights-of-way, projected costs, etc. The subjects are summarized in the following figures. They should be read in conjunction with the map.

22 OH/CAI Summary Report, p. 23-24.



- | | |
|---------------------------------|-----------------------------------|
| — RECOMMENDED ROUTE | — STUDY AREA BOUNDARY |
| - - - ALTERNATE ROUTE | - - - TOWNSHIP BOUNDARY |
| ○ RECOMMENDED SWITCHING STATION | □ RECOMMENDED TRANSFORMER STATION |
| □ GENERATION STATION | □ ALTERNATE TRANSFORMER STATION |
| ○ ALTERNATE SWITCHING STATION | |



Alignments on this map are diagrammatic.

MAP 1 OH/CAI Alternative Routes

SOLANDT COMMISSION INQUIRY:

into the proposed route of
power transmission facilities between
Oshawa and Lennox

APRIL 1975

Property
acquired for
transmission line
between G.S. to
Mr. Pleasant Junction
from Lennox

PROJECT PROFILE

i) Ontario Hydro proposes to use two-circuit lines along the selected route. While one-circuit lines would have meant shorter towers, a wider right-of-way would have been required. Public opinion in the study area, as expressed through questionnaires and at public meetings, showed a marked preference for the narrower rights-of-way with taller towers.

Approximate dimensions are these:

- Tower height (two-circuit towers) 162 feet
- Distance Between towers 900 feet²³
- Tower base dimensions [31 by 31 feet]

ii) Economic comparison of alternative routes

The cost of providing the required system facilities for the various alternative routes has been estimated. The estimates include the estimated cost of property acquisition and the cost of installing all facilities expected to be required by 1988. The facilities are those required to incorporate two generating stations on the Lennox GS site and the first station on each of the Wesleyville and Darlington GS sites. [They are shown in solid lines on figures 1 and 3. The lines marked with dashes would only be required when and if additional stations are added at the Wesleyville and Darlington sites. The 900 foot right-of-way emerging from the two stations is to accommodate future 230 kV lines in addition to the 500 kV lines in order to supply local demand for power.]

1975 Present Worth of Estimated
Costs of Facilities Required
by 1988
Millions of Dollars

Alternative Routes	Switching Stations	Transmission	Total
Recommended	95.5	96.0	191.5
Southern	100.5	88.5	189.0
Middle	95.5	95.0	190.5
Northern (Tyrone)	95.5	96.0	191.5
Northern (Pontypool)	95.5	104.0	199.5 ²⁴

23 OH/CAI Summary Report, p. 7.

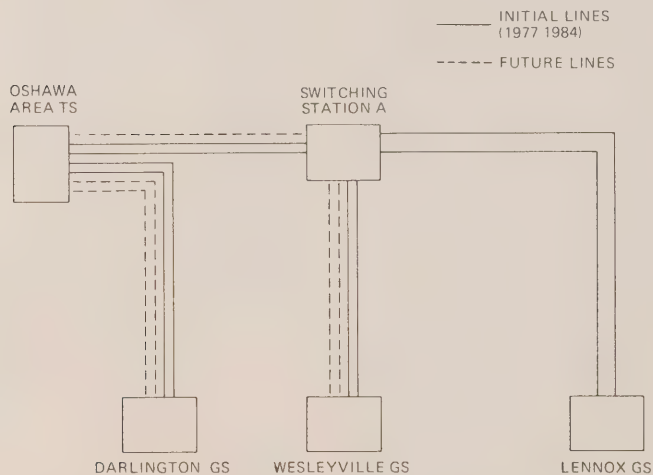
24 OH/CAI Summary Report, p. 45.

iii) Figure [1] shows the transmission lines needed to incorporate the Lennox, Wesleyville and Darlington stations if the most northerly of the alternative routes is used. Figure [3] illustrates the transmission lines required by a southerly route between Wesleyville GS and the Oshawa Area Transformer Station.

Illustrations of the widths of rights of way and transformer and switching stations [are also shown.] . . .²⁵

Figure 1

*500kV Transmission Line
and Stations Requirements*



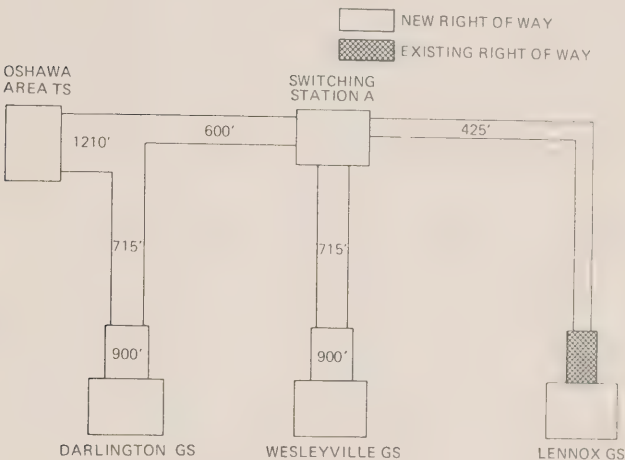
Northern or Middle Route

Source: OH/CAI Summary Report, p. 8.

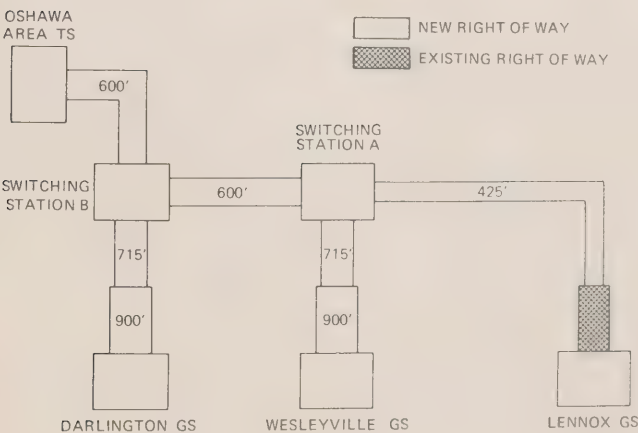
²⁵ OH/CAI Summary Report, p. 7.

Figure 2

Widths of Rights of Way



Northern or Middle Route

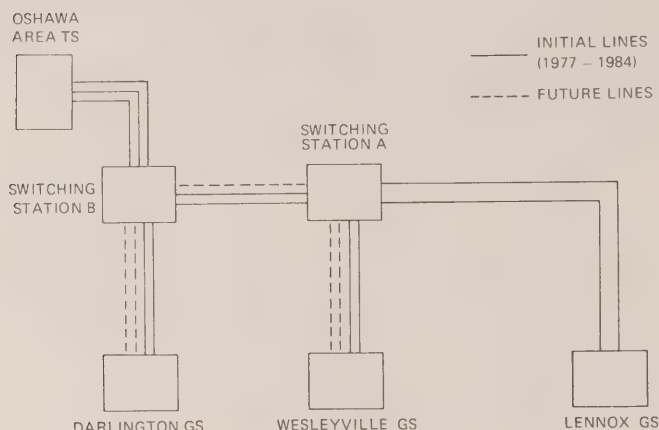


Southern Route

Source: OH/CAI Summary Report, p. 9.

Figure 3

500kV Transmission Line and Stations Requirements



Southern Route

Source: OH/CAI Summary Report, p. 8.

iv) TRANSFORMER AND SWITCHING STATIONS

The facilities in the transformer and switching stations will be of a new low profile design which has been developed to permit effective landscaping compatible with the surrounding area.

The availability of 500 kV SF₆* gas insulated switchgear and bus-work having the required reliability and capability to meet the system needs will affect the ultimate station area. Ontario Hydro is interested in using SF₆ at 500 kV and is taking an active interest in its development to this voltage level. At this time it is believed that SF₆ switchgear will provide adequate security for extensions to the 500 kV system some time during the 1980's.

On the basis of the above considerations it is estimated that the 500 kV station site sizes would be:

Station	Approximate Site Dimensions
NORTHERN ROUTE	
Oshawa Area TS	3100'x2800'
Switching Station "A"	3600'x2600'
SOUTHERN ROUTE	
Oshawa Area TS	2600'x2300'
Switching Station "A"	3600'x2600'
Switching Station "B"	3700'x2600'

These site sizes are required to accommodate the initial and future station facilities and include an allowance for landscaping.²⁶

* See p. 155 for details of SF₆ switchgear.

26 OH/CAI Summary Report, p. 7 - 10.

FURTHER ALTERNATIVES

In their report, OH/CAI presented to the Solandt Commission a single recommended route. They divided the study area into three regions and described their recommended route township by township. In most townships there were three possibilities from which one was selected. For each of the three regions of the study area they described in some detail the environmental impact not only of their recommended route but also of the alternatives.

A narrow interpretation of the terms of reference of the Solandt Commission might suggest that its task was merely to listen to public comment on the OH/CAI recommended route and then to advise the government to permit Ontario Hydro to use it or not to use it. However, the OH/CAI report makes it quite clear that their recommended route was not unanimously supported by provincial government ministries, regional planning authorities, municipalities or the general public. The submissions to the Solandt Commission and the discussion at the public hearings further emphasize the differences of opinion. In addition, it became clear early in the proceedings not only that many of the agencies and individuals concerned felt that the study area should have extended north of Rice Lake to include the Gatineau right-of-way but also that inadequate attention had been given to other alternatives within the study area, particularly in the western section. It would, therefore, have been meaningless for the Commission to restrict its consideration and public discussions to the one OH/CAI recommended route. Consequently, the Commission indicated early in the hearings that it was prepared to consider submissions in support either of the alternatives discussed in the OH/CAI report or of other alternatives, provided they were described with reasonable precision and supported with some evidence of suitability.

At the end of the first phase of the hearings (page 15) I concluded that in my final survey of possible routes some consideration must be given to:

- 1) all the alternatives discussed in the OH/CAI report;
- 2) several ways of using the existing Gatineau right-of-way as part of a link between Lennox and Oshawa, since this possibility was strongly supported by the majority of farmers and other landowners along the OH/CAI recommended route and by some of the ministries and planning agencies;
- 3) a rather ill-defined route in the western end of the study area through or adjacent to the Ganaraska Forest supported by the Ontario Federation of Agriculture, the Ministry of Agriculture and Food and many of the farmers in the area to the south of the forest;
- 4) also in the western end of the study area, a route linking the Wesleyville and Darlington Generating Stations on a right-of-way quite close to Highway 401 which received some support from the public and from planners in the area.

In order to make this report self-contained, a brief description of each of these alternatives is included. The description of the OH/CAI recommended route has already been given on pages 39 and 40.

OH/CAI Alternative Routes

The OH/CAI report describes three alternative and fairly closely spaced routes over most of the distance from Lennox to Oshawa. Their recommended route was selected from these possibilities by OH/CAI in light of the results of their public participation meetings. Not only their recommended route but also all the rejected alternatives were left open for public discussion during the Solandt Commission hearings. During the hearings, many landowners appeared to oppose the OH/CAI recommended route and, in a few cases, to support one of the alternatives. Following the hearings, the Commission carefully studied and analyzed these presentations in conjunction with data on public preference ballots presented on pages 223 to 225 of the OH/CAI report. It was found that there were several places in which the impact of the OH/CAI recommended route could be reduced in one area but only at the expense of increasing it in an adjacent area. In no case did one of the alternatives appear to be clearly superior to the OH/CAI recommended route so the alternatives are not discussed further in the present report. They are shown on Map 1 along with the OH/CAI recommended route. From this map the reader can get a general idea of the nature of all the alternative routes that were discussed. Anyone interested in further details must consult the original OH/CAI report.

The Gatineau Route Alternatives

During the evolution of their generating system Ontario Hydro developed a series of hydro-electric generating stations on the Ottawa River and made long term contracts for power from other stations on the Gatineau River. To connect these generating stations to the Toronto load centre, a 230 kV power line was built from Chats Falls near Ottawa to Leaside on the outskirts of Toronto. Over the years from 1928 to 1948, four single-circuit 230 kV lines were built on this right-of-way. Ontario Hydro did not purchase the right-of-way but merely bought easements for each tower site from the landowners. As each successive line was built deviations were made to avoid the need to remove homes or farm complexes adjacent to the pre-existing right-of-way. In general, the final right-of-way is about 500 feet wide but in a few places where it goes around buildings is as wide as 1,100 feet. In some cases it consists of several widely separated rights-of-way. The location of the proposed Oshawa Area Transformer Station was selected so that the old Gatineau lines could be terminated there and the circuits could continue on to the Cherrywood Station over new lines to be built on the old Gatineau right-of-way.

In the OH/CAI report the study area was limited to the south of Rice Lake and therefore did not include the Gatineau route. The majority of those who appeared before the Commission supported the use of the Gatineau route so at the request of the Commission Ontario Hydro made a reasonably detailed study of that route and presented it to the Commission. This presentation was later amplified by further information presented by Mr. Tom Sparling. As a result the Gatineau route received almost as detailed consideration as the original possibilities studied by OH/CAI.

About 80 miles north-east of the Oshawa Area Transformer Station the Gatineau right-of-way crosses another existing 230 kV line at Keller Bridge. This line runs almost due east to Hinchinbrooke which is roughly 25 miles north of Kingston. An existing 230 kV right-of-way runs south from Hinchinbrooke to Cataraqui and a right-of-way already exists from Lennox Generating Station to Cataraqui (Figure 5, page 78).

The proposal most frequently advanced was that a Lennox to Oshawa route via the Gatineau lines would follow these existing rights-of-way. Another possibility, briefly discussed, was to run the lines from Lennox to Mount Pleasant Junction as in the OH/CAI route, and then approximately straight north from Mount Pleasant Junction through Richmond Township to join the 230 kV right-of-way from Keller Bridge to Hinchinbrooke.

Ontario Hydro submitted a brief environmental assessment of these routes to the Commission in October 1974. The following description is largely extracted from this submission:

3.2.1 Oshawa Area TS-Keller Bridge

For the most part, this section crosses high capability agriculture land, except near Pontypool and north of the town of Havelock; although in the area west of Keller Bridge, there are only pockets of class 1 land.

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The significant features of this section are:

- i) The existing right of way passes both close to and through cottage developments on Lakes Belmont and Crowe.
- ii) The right of way passes very close to and partially through development on the east and south sides of the village of Pontypool.
- iii) It passes through existing built-up sections of the villages of Havelock and Norwood.
- iv) There are a number of locations where the lines divide, in varying fashion, to go around buildings.

3.2.2 Keller Bridge to Hinchinbrooke SS

A proposed alignment here would be adjacent to and south of the existing 230 kV line. This section of the line is almost entirely on the Canadian Shield, except for small pockets of till plains in Madoc and Elzevir Townships which are farmed.

While this section is lightly populated, the numerous rivers, creeks and undulating terrain will make construction difficult while attempting to minimize impacts. There are very few roads.

The significant feature of this section is some development at Keller Bridge.

3.2.3 Hinchinbrooke SS to Cataragui TS

For approximately 10 miles south of Hinchinbrooke, numerous lakes and streams will have to be crossed by the line on the Canadian Shield. Below Hartington, on the Napanee till plain, agriculture is prevalent, although the soil is shallow in many places. There is a mixture of farming and cottage development.

The significant features of this section are:

- a) There are a 230 kV line and a 115 kV line on different rights of way in this area. An additional 230 kV line has been approved for construction on the 230 kV right of way.
- b) At certain locations because of the location of the existing 230 kV line close to lakes, the addition of more lines may be difficult.

3.2.4 Cataragui to Lennox GS

The right of way traverses a clay plain, with limestone very close to the surface, especially in the forested areas. The type of forest cover (cedar) lends itself to selective cutting.

The agricultural land is of varying qualities. There is a limited amount of rural estate development and some strip development along some significant roads, e.g., Highway #2.

The significant features of this section are:

- a) For some distance out of the generating station, the right of way parallels the scenic Highway #33 on the north side of the North Channel.
- b) The crossings of Highways #2 and #401 would require a detailed study.

3.2.5 Possible Dropoff from the Gatineau Right of Way to Central Lake Ontario GS

If Central Lake Ontario GS were connected to the Gatineau right of way by a route to the east of Rice Lake near Hastings, it would cross approximately 30 miles of predominately high capability farmland.

3.2.6 Possible Dropoff from the Keller Bridge x Hinchinbrooke Right of Way to Mt Pleasant Jct

South of the 230 kV line, for 5 miles, the proposed route crosses the Canadian Shield. South of Otter Creek, in Hungerford Township, the line crosses shallow till over limestone before reaching higher capability agricultural land in mid-Richmond Township.

The impacts of this line would be light, generally speaking.²⁷

Route Alternatives: Western Section

The OH/CAI recommended route and the Gatineau route do not coincide at any point between Lennox and Oshawa. They are completely distinct and separate alternatives. The routes that are now to be described, the Ganaraska routes and the 401 routes, differ from the OH/CAI recommended route only in the western part of the study area. In order to make them into complete routes the Ganaraska routes must be combined with the OH/CAI recommended route eastward from a point near Rossmount (just south of Bewdley at the west end of Rice Lake) to the Lennox Generating Station, and the 401 South route must be similarly combined from a point just east of Osaca. During the hearings descriptions and statistics were often given for partial routes. It was found that this led to great confusion, so in this final report and particularly in Tables II and III figures for each route include the entire distance from the Lennox Generating Station to the Oshawa Area Transformer Station.

27 G. B. Pearson, Ontario Hydro, Effect of Locating the Lennox-Oshawa 500 kV Transmission on the Gatineau Right of Way, October 1974, p. 6 - 9.

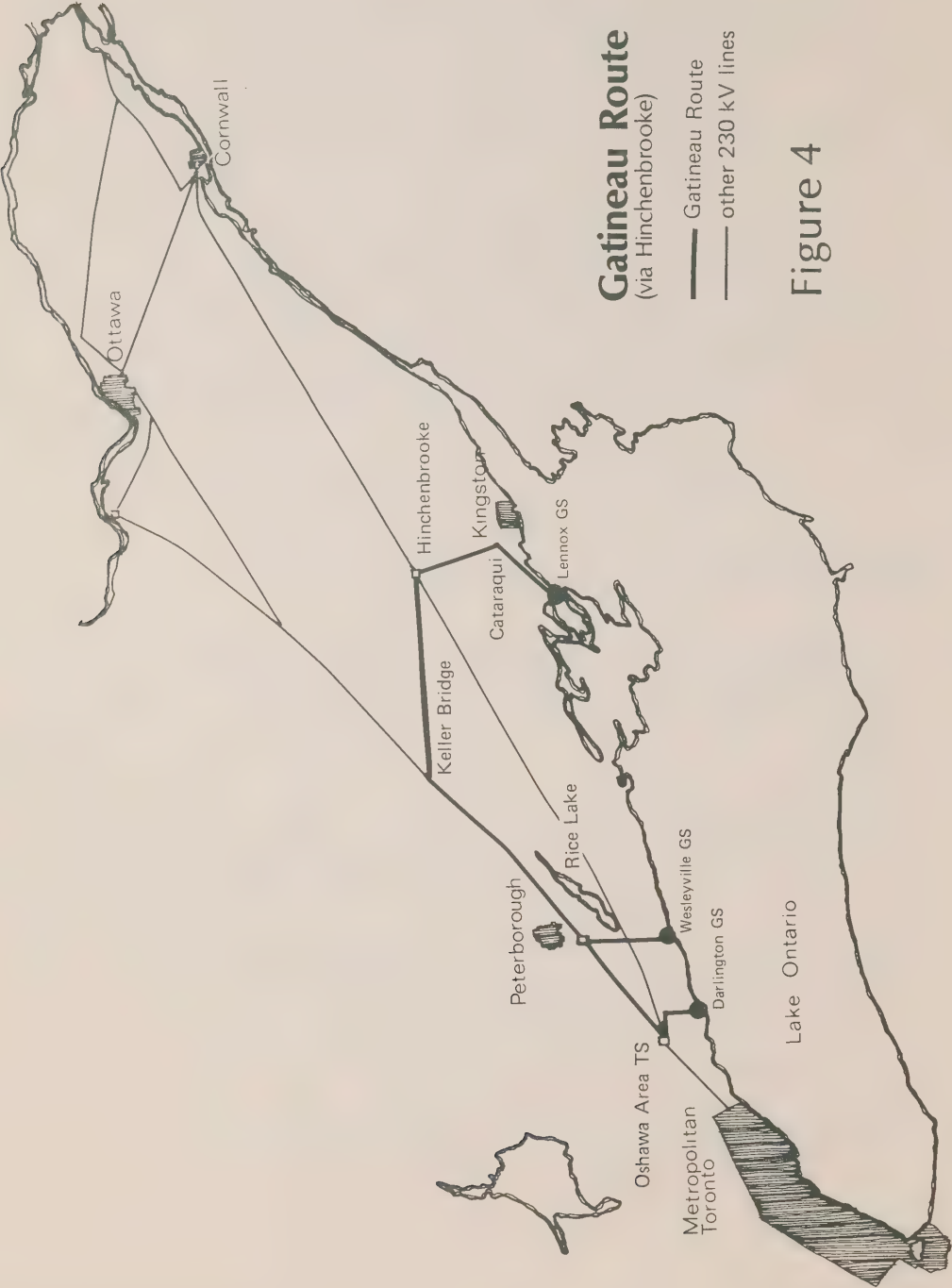


Figure 4

The Ganaraska Route Alternatives

The Ganaraska Forest proper consists of 8,635 acres of woodland, mainly reforested, which is owned by the Ganaraska Region Conservation Authority and managed by the Ministry of Natural Resources. The main portion of the forest is in Concessions IX and X of Clarke Township, Concession X of Hope Township and Concession I of Cavan Township, with several small sections running into Manvers Township. The forest is approximately 8 miles from east to west and from 1½ to 2 miles from north to south. In addition to the forest proper there are other woodland areas running generally eastward from the forest almost to Bewdley on Rice Lake. (More details of the forest are given on page 125.) Since the area is very sparsely settled and is mainly composed of reforested areas with some original forest, it has been repeatedly suggested as a possible route for the line.

The significance of the forest and the arguments for and against putting the route through it will be presented in a later section. The purpose now is merely to describe in very general terms possible routes through and adjacent to the forest so that the reader will have in mind a picture of all the possibilities.

The original study area extended only to the northern boundary of Clarke Township. Under pressure from the public Ontario Hydro and CAI extended their study area northward to include Manvers Township and selected a route described in the OH/CAI report as Route D which went north through the east end of the forest.

Route D is shown on Map 1. It runs almost due north from the OH/CAI recommended route which it leaves in Concession V of Clarke Township. It continues north through Clarke on the lot line between the 3rd and 4th Lots, enters Manvers Township on the line between the 23rd and 24th Lots and proceeds north to Concession II of Manvers where it turns and runs due west south of Pontypool and, having crossed Highway 35, joins the Gatineau right-of-way which it follows from there to the Oshawa Area Transformer Station.

The agricultural community objected to Route D and the Ontario Federation of Agriculture described in a general way a more southerly route which would cross directly through the forest in Concessionx IX or X of Clarke Township. Such a line would produce the greatest possible disturbance of the forest so, at the request of the Commission, Mr. Sparling outlined a third possible route.

In its first part the route drawn up by Mr. Sparling (Map 2) is the same as Route D. It starts in Concession IV of Clarke Township and runs north along the lot line between Lots 3 and 4 where it then turns due west in Concession VIII of Clarke, crossing into Darlington Township where it is in Concession VII and continues directly to the Oshawa Area Transformer Station. This line passes just south of the Ganaraska Forest and just north of the best farmland in Concession VIII of Clarke. Mr. Sparling also identified a variant of this route which swings north just west of Highways 35 and 115 in order to avoid passing close to the villages of Leskard and Tyrone and then rejoins the original route just west of Tyrone.

The Highway 401 Route Alternatives

Throughout all the hearings both municipal planners and the public frequently gave support to the concept of a utility corridor. In his personal submission to the Commission Mr. P. Giles pointed out that in the western portion of the study area, by using a route close to Highway 401 between the Wesleyville Generating Station and the Darlington Generating Station, the transmission line would in fact be located in an existing utility corridor. Although this area was certainly not planned as a utility corridor it has evolved into one of the very few places in Ontario where a variety of important linear land uses have been concentrated in quite a narrow width. Between Port Hope and Oshawa, Highways 2 and 401 and the main lines of the Canadian National and Canadian Pacific Railways are located in a narrow strip which extends from 2 to 3 miles north from the lakeshore.

In replying to Mr. Giles' presentation Ontario Hydro said they had considered the possibility of a route in this area and saw no reason to rule it out from further consideration. As a result the Commission retained Mr. Sparling to portray the facts concerning such a route. Since the original OH/CAI study area had extended to the lakeshore, this portion has been subjected to the same basic environmental study as has the rest of the area. Building on this date and with the close co-operation of Ontario Hydro Mr. Sparling was able to produce adequate information very quickly. Mr. Giles' proposal included an alternative route which went diagonally from the OH/CAI recommended route in the vicinity of Rossmount to the Wesleyville Generating Station. Mr. Sparling gave careful consideration not only to Mr. Giles' proposal in this area but also to an alternative route of his own devising, south from the vicinity of Rossmount. Both were carefully examined and discussed at the hearings in Newcastle and Kendal but neither seemed to present advantages over the OH/CAI recommended route as far as Osaca and so were not considered further.

In a report dated October 7th, 1974, Mr. Sparling presented his information to the Commission. Map 2 portrays the two routes being considered between the Wesleyville Generating Station and the Darlington Generating Station. They are designated Routes 401 North and 401 South. The following descriptions are taken directly from Mr. Sparling's report:

"A-North" [401 North]

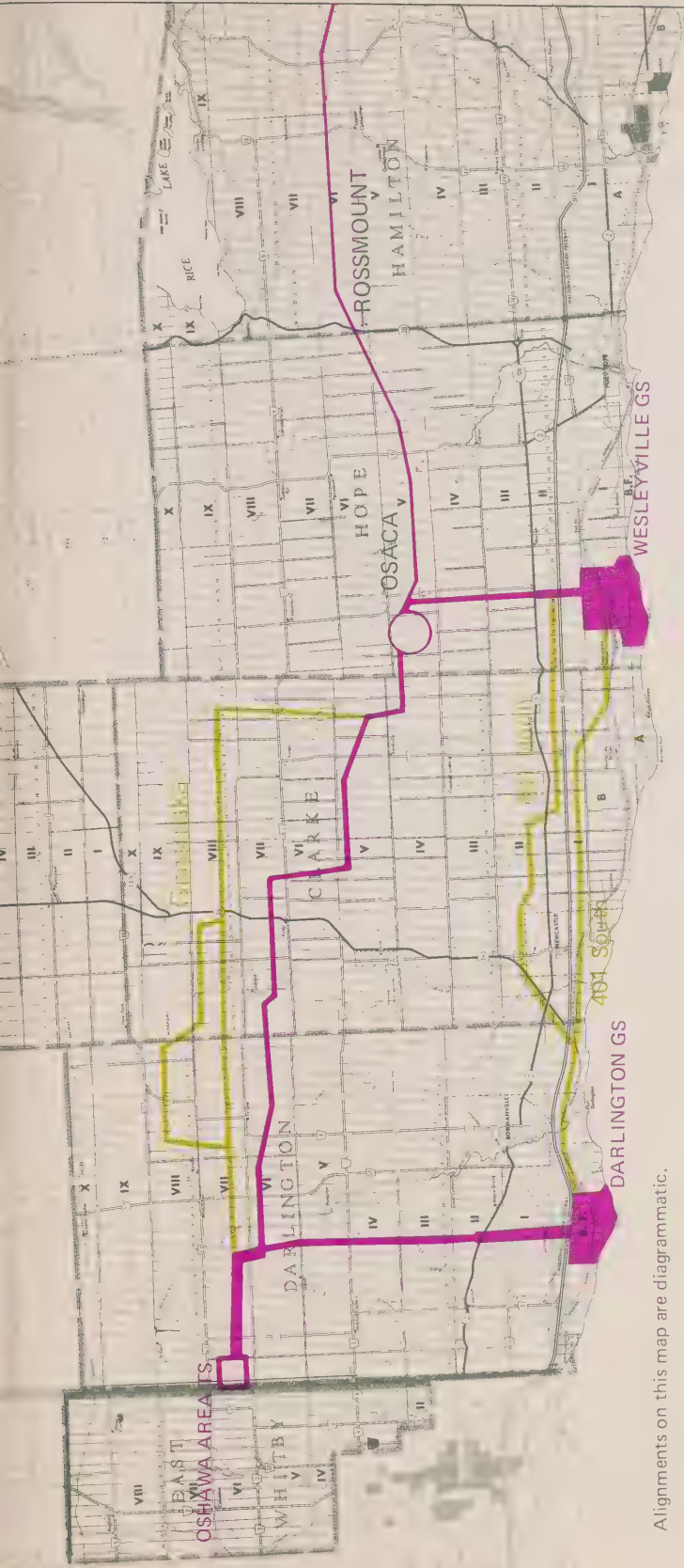
Proceeding north from Wesleyville Station, this alignment would cross Highway 401 in the location recommended by Hydro-Commonwealth for their connection to the north. After crossing Highway 401, the route turns west immediately and proceeds parallel to the 401 with approximately a 200 foot setback. Passing across primarily scrub woodland between Highways 401 and 2, the alignment turns north-west in the vicinity of Lots 15 and 16, Concession I and crosses Highway 2 over a gravel pit. From this point it runs directly west crossing the south side of the golf course, to Graham Creek. It spans Graham Creek and follows the "town limits" to Highway 35 and 115. After crossing 35 and 115 near the curve, it turns south along the west side, crosses the interchange at 401 and meets the CN railway. It follows the railway, passes north of the marina on Bowmanville Creek, across the north end of the marshland and into the Darlington site, north of the St. Mary's Cement plant.

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"B-South" [401 South]

From Wesleyville Station the route proceeds west along the CN-CP tracks to Granby Creek. East of the creek the alignment turns northwest, crosses the creek, to the lots south of Highway 401. Here it turns west, paralleling the highway to Newcastle. The route crosses orchard operations, the Foster Creek and the trailer camp in Walton Park. Turning northwest, across Wilmot Creek the lines then parallel the CNR track to meet the route as previously described for "A-North" at the intersection of Highways 401 and 35/115.²⁸

28 Tom Sparling, An Evaluation of Alternate Routes for the Solandt Commission's Public Inquiry into the Transmission of Power Between Lennox and Oshawa, October 7th, 1974, p. 7 - 8.



Alignments on this map are diagrammatic.

MAP 2 Sparling Study: Ganaraska & 401 Routes

SOLANDT COMMISSION INQUIRY:

into the proposed route of
power transmission facilities between

Oshawa and Lennox

APRIL 1975

-  Alternate Routes
-  Hydro-Commonwealth Recommended Route
-  Hydro-Commonwealth Recommended Switching Station
-  Alternate Switching Station
-  Generation Station
-  Transformer Station



Underwater Cable

The possibility of linking all the lakeshore generating stations including Lennox, Wesleyville, Darlington and Central Lake Ontario (should it be built) by underwater cables in the lake is a most attractive one. If the connection from the Darlington Generating Station to the Oshawa Area Transformer Station could then be made by underground cable the entire system would have no visual impact and very little environmental effect. The possibility of underground systems was fully considered at a previous hearing on the Nanticoke to Pickering 500 kV line held by this Commission. The evidence presented led the Commission to conclude that underground cables of the length and capacity being considered in this system are just not practical at present. Ontario Hydro presented evidence to show that while many underwater cables were operating they had all been installed in areas where no alternative was available. They stated that the cost of underwater cable systems of adequate reliability would be at least as great as for underground systems. The Commission therefore reluctantly concluded that only overhead lines should be considered.

THE IMPACT OF THE ONTARIO HYDRO LONG RANGE PLAN

When the Honourable Darcy McKeough released the Ontario Hydro Report entitled "Long Range Planning of the Electric Power System" at a press conference in July 1974, he said that it would be the subject of extensive public hearings in the future but that in the meantime I had been asked to consider its impact on the task before this Commission. This has been done and specific discussions have been held on these impacts. Although each of them is referred to in other places in the report they have been gathered together here for purposes of clarity. The impacts are sub-divided under three headings which are discussed below.

(i) *Timing of Construction of Additional Generating Stations*

By its terms of reference the Commission was instructed to consider the location of transmission lines necessary to connect generating stations at Lennox, Wesleyville and Darlington to the Oshawa Area Transformer Station. In the OH/CAI report the requirement for circuits in the various parts of this system is divided on two time scales: the first, from 1977 to 1984 and the second, which is designated merely "future". Throughout their report provision is made to accommodate these future lines including not only two additional double-circuit 500 kV lines out of each of Wesleyville and Darlington Generating Stations but also some additional 230 kV lines out of each to supply local needs. Analysis of the circuits provided indicates that these future lines will permit the incorporation into the system of power from three additional generating stations, one each at Lennox, Wesleyville and Darlington.

The Ontario Hydro long range plan (1983-1993) includes a series of estimates for peak load and generation requirement. The highest is based on the assumption of growth increasing to 10% per annum by 1982 and continuing at 10%; the so-called base or inter-

mediate projection assumes a continuation of load growth at 7% per annum as in the past; the low prediction assumes load growth decreasing to 4% by 1982 and continuing at 4%. The location and date of construction of generating stations is given for five alternative programs: three at 7% load growth and one each at 10% and 4%. In three of these a new station which would be in the study area appears at a site lying somewhere between Cobourg and Brighton called "Central Lake Ontario". The effect of this new generating station and of the timing of construction of additional stations at the other three sites in the study area (Lennox, Wesleyville, Darlington) is discussed fully on page 66. The reader who wishes to study the program in detail should consult Ontario Hydro's long range plan.²⁹

(ii) *By-Pass Around the Oshawa Area Transformer Station*

Ontario Hydro's original plans for the 500 kV network east of Toronto included two alternative routes to connect the Darlington, Wesleyville and projected Central Lake Ontario Generating Stations to the Toronto load centre: one by way of the western part of the existing Gatineau right-of-way to the Cherrywood Transformer Station and another going further north to a transformer station at Claremont. With the advent of the Pickering Airport the plans for the transformer station at Claremont were dropped and the proposal to route all of the lines from the three generating stations through the Oshawa Area Transformer Station was put forward. In discussing their long range plans before the Commission, Ontario Hydro emphasized the need for a route that would by-pass the Oshawa Area Transformer Station when the total generating capacity on Lake Ontario between Oshawa and Kingston grew beyond these first three stations. It appears from their testimony that provision for the by-pass should have been included in the OH/CAI report, since the report does provide transmission

²⁹ Ontario Hydro, Long Range Planning of the Electric Power System, July 1974.

facilities for additional generating stations at Lennox, Wesleyville and Darlington with a combined capacity of at least 12,000 megawatts. Therefore, the provision of this by-pass should not necessarily be linked only with the construction of the Central Lake Ontario Station.

(iii) *The Lennox to Ottawa and Lennox to Cornwall 500 kV Lines*

Because of the impending termination of the contracts for power supplied to Ontario by Hydro Quebec in the Ottawa region, Ontario Hydro received support from the Provincial Minister of Energy to proceed with plans for 500 kV lines from Lennox to Ottawa and from Lennox to Cornwall.

At the request of the Commission Mr. G. B. Pearson, Planning Engineer, Power Transmission, Ontario Hydro, reported on the "Effect of Extending the 500 kV System to Ottawa and Cornwall on the Choice of Route for the Lennox-Oshawa Transmission" in October 1974. He showed that any effort to combine the two routes would result in increased cost and mileage. If the Lennox to Oshawa lines were routed by the Gatineau right-of-way and through the Hinchinbrooke Switching Station to Lennox, it might be possible to reduce total line mileage for the Lennox to Ottawa route by running the two parallel in the section from Lennox to Hinchinbrooke (see Figure 4, p. 54). However, in order to gain this small advantage it would be necessary to route the Lennox to Oshawa connection by way of Hinchinbrooke to the Gatineau right-of-way which is by far the longest of the alternatives considered. In addition careful study may well show that the best route for the Lennox to Ottawa lines does not go through Hinchinbrooke.

The lively discussion that followed this presentation presented no promising alternatives. The Commission therefore concluded that the problems of finding new 500 kV routes to Ottawa and Cornwall could be separated from the problems of locating the Lennox to Oshawa route and that it

would be preferable to deal with the problems of the Lennox to Ottawa and Lennox to Cornwall routes at separate hearings in the future (see also page 123).

PREPARATION OF DATA FOR FINAL ROUTE SELECTION

In the discussions before the Commission, it was often apparent that data presented on various routes were not directly comparable, so with the help of Ontario Hydro they were made strictly cross-comparable. In preparing this data, one of the most elusive factors was the timing of construction of generating stations and of related transmission lines. The publication of Ontario Hydro's long range plan, which offered a variety of alternative programs for the future construction of generating stations, did nothing to lessen the uncertainty. To simplify the discussion of alternative routes the future has been arbitrarily divided into three stages which are described below. It will be seen that Stage I is well defined in everything but its final date of completion whereas Stages II and III are still poorly defined but nevertheless must be considered.

Stage I

Stage I has been arbitrarily defined to include the completion of one generating station³⁰ at each of the Lennox, Wesleyville and Darlington sites and their connection to the Oshawa Area Transformer Station. The actual construction of transmission lines that will be required for Stage I is shown on the diagrams for each of the alternative routes and is the same as that shown in solid lines in the diagrams on pages 44 and 46 taken from the OH/CAI report. At Stage I only one circuit will be strung on

30 The terminology of generating stations is confusing and difficult. Throughout this report an attempt has been made to adhere to the terminology used in the OH/CAI report. In that report, a generating station consists of a series of units contained in a single building. At present, Ontario Hydro's new construction consists of 500 megawatt units each consisting of a steam turbine driving a generator. Later units will be larger. Ontario Hydro's present plan for the Darlington Station is a nuclear station of four units each producing 750 megawatts so that if it is built as planned the station will have an output of 3,000 megawatts. In Stage II, where it is indicated that a second generating station is built on a site, this means that four more units are added. They could conceivably be housed in an addition to the original building but for purposes of simplicity this is described as a second generating station whether in the same or a separate building.

each of the two-circuit lines from Lennox to Switching Station A on the OH/CAI recommended route or Lennox to Wesleyville on the Commission route. In calculating the costs for Stage I shown on Table II, the cost of the two additional circuits that could be strung was not included. However, in calculating the cost figures that are shown in the OH/CAI report (see page 43 of this report) it was postulated that by 1988 (the year for which the costs were calculated) there would be a second generating station on the Lennox site and therefore these two additional circuits from Lennox to Switching Station A would have been strung and the appropriate switch gear installed at both ends. (See Note 4, page 101.)

Stage I is already well started since the Lennox Generating Station is nearing completion and construction on the Wesleyville Generating Station has been started. It is still impossible to give a completion date for Stage I since, although the Government has approved the construction of a station on the Darlington site, it has not yet approved the type of station or the starting date for construction. The long range plan helps very little since the 5 alternatives described on page 61 include starting dates for the first station at Darlington that are spread from 1980 to 1986.

Stage II

At the completion of Stage II a second generating station would have been completed on each of the three station sites, Lennox, Wesleyville and Darlington, thus providing total generating capacity for the three sites of somewhere between 15 and 22,000 megawatts. Provision for connecting this added generating capacity to the 500 kV transmission system has been made in the egress rights-of-way described in the OH/CAI report. Stage II is considerably more nebulous than Stage I since neither a starting date nor a completion date can be given with any certainty. Provision for a second station at each of the sites is made in one or more of the alternative plans put forward in the Ontario Hydro long range plan. In these alternatives the sequence of construction differs considerably and

in some these stations are not included. In spite of this uncertainty Stage II has been included as a factor in the present route selection because Ontario Hydro does now own the three generating station sites; each of the sites is large enough to permit the installation of up to 12,000 megawatts of generating capacity per site and when the first generating station at each site is connected to the 500 kV network a right-of-way out of the generating station will exist. Consequently, Stage II represents a very important fall-back position for Ontario Hydro should plans for the acquisition of other generating sites be too long delayed. The discussion of transmission line requirements for Stage II should not be taken as any commitment that Stage II will ever be reached. However, the later discussion will make it clear that the route selected by the Commission for Stage I keeps the option of Stage II open for the future at negligible cost.

Stage III

Ontario Hydro system planners state that whenever additional generating capacity beyond that provided for in the OH/CAI report is added in the study area, a by-pass around the Oshawa Area Transformer Station must be built. Stage III might well include the construction of a generating station at a not yet selected site between Cobourg and Brighton which is designated in the Ontario Hydro long range plan as the Central Lake Ontario Generating Station. On the other hand, Stage III with its need for the Oshawa Area Transformer Station by-pass might be achieved during Stage II when second generating stations are built at Wesleyville or Darlington. Because of these uncertainties of time and place it is not possible to discuss a route for this by-pass now. The route to be finally selected will be strongly influenced by the sequence of construction of further generating stations on Lake Ontario, by the evolution of the 500 kV network and especially by the route selected for a connection to the Toronto load centre from generating stations on Georgian Bay. Thus the Commission can at this stage do no more than support Ontario Hydro's argument that a by-pass will be essential to the security of the system when and if the requisite generating capacity is built and put in operation.

It is felt that Stage III is too far in the future and the plans for it too nebulous to allow quantitative description. No one yet knows when or on what route the Oshawa Area Transformer Station by-pass will be built. However, Stages I and II are reasonably definable and so two separate tables of data, one for time Stage I and the other for time Stage II, have been prepared.

Apart from the difficulties in time phasing there were also difficulties of other kinds that make comparison difficult. This was not due basically to inaccurate information but rather to the fact that different authors used different bases for comparison. For example, in some of the earlier tables the Lennox to Oshawa route did not include the 11 miles from Lennox to Mount Pleasant Junction. Similarly, in discussing the Gatineau route the 18 miles from Lennox to Cataraqui were sometimes omitted. All the relevant information was brought together, cross checked and now appears in Tables II and III. The figures in these tables should be considered as the authoritative figures to be used for future discussions. The work of re-checking has been done by John Sedgwick and others at Ontario Hydro under the guidance of Tom Sparling acting on behalf of the Commission.

The principal alternative routes that were considered during the hearings are described on pages 39 to 59. It will be noted that in these descriptions are included two possible Gatineau routes, three so-called Ganaraska routes, two variants of the OH/CAI recommended route and two Highway 401 routes. In preparing Tables II and III, the best one from each of these groups of alternatives was selected. For the Gatineau, the route via Hinchinbrooke; from among the Ganaraska routes, Route D as described in the OH/CAI report; from among the OH/CAI middle routes, their recommended route throughout and, from among the Highway 401 routes, the 401 South (combined with the eastern part of the OH/CAI recommended route, from Lennox to the Wesleyville Generating Station, in order to make a complete route). The reasons for making these selections are described in detail starting on page 76.

Table II
Comparison of Alternative Routes

Stage I				
	Gatineau	OH/CAI	D	401
1. Mileage				
a) Route Miles	184	122	131	117
b) Line Miles	369	251	262	246
2. Buildings				
a) Residences	21	10	10	12
b) Farm Centres	22	3	3	4
c) Total Homes	43	13	13	16
3. Total Acreage	8,110	6,580	6,970	6,290
4. Agricultural Acreage				
a) Class 1 and 2 Soil Capability	2,790	3,260	2,850	2,930
b) Cultivated Land	3,050	3,700	3,680	3,280
c) Actively Cultivated Land	N/A	2,140	1,910	2,030
5. Forest Acreage				
a) Woodland	1,820	1,290	1,260	1,150
b) Plantations	180	80	260	80

Table III
Comparison of Alternative Routes
Stage II

	Gatineau	OH/CAI	D	401
1. Mileage				
a) Route Miles	184	122	131	117
b) Line Miles	438	303	320	260
2. Buildings				
a) Residences	21	12	16	13
b) Farm Centres	22	5	5	4
c) Total Homes	43	17	21	17
3. Total Acreage	9,560	7,720	8,200	6,590
4. Agricultural Acreage				
a) Class 1 and 2 Soil Capability	3,560	4,140	3,500	3,240
b) Cultivated Land	3,760	4,200	4,320	3,380
c) Actively Cultivated Land	N/A	2,630	2,320	2,250
5. Forest Acreage				
a) Woodland	2,110	1,430	1,500	1,170
b) Plantations	260	80	310	80

Tables II & III

Notes:

Column:

Gatineau contains data for a complete route from the Oshawa Area Transformer Station northeast along the Gatineau right-of-way to Keller Bridge, Hinchinbrooke, Cataraqui and Lennox. This is described on page 76.

D contains data for OH/CAI Route D which is representative of the "Ganaraska" routes described on page 85.

CAI contains data for the OH/CAI recommended route described on page 79 of this report.

401 contains data for the 401 South route presented by Mr. Sparling and described on page 89. Since Mr. Sparling presented only a route from the Wesleyville Generating Station to the Darlington Generating Station and on to the Oshawa Area Transformer Station, this route has been combined with the OH/CAI route from Wesleyville eastward to the Lennox Generating Station in order to provide comparable quantities for a complete route.

Line:

1(b) Figures are miles of double-circuit 500 kV lines.

2(a) & 2(b) A farm is not merely the place where a family lives but is also the headquarters of the farm business through which the family earn their livelihood. Therefore the removal of the farm home is of greater potential importance than the removal of a simple residence, and so an effort has been made to distinguish between the two in these lines. A residence in line 2(a) is a residential building which may have some out-buildings such as a detached garage but is obviously not the centre of a farming operation. A farm centre in line 2(b) is a farm home with a barn and other ancillary buildings that make up the work centre of a farm.

- 3 The OH/CAI recommended route included a switching station in Concession V of Hope Township not far from Osaca. During the public hearings it was suggested and Ontario agreed that this station if built would be better located in Concession III of Hope Township. The station site is 3600' x 2600' or 215 acres. Of these 215 acres (which include 135 acres of soil capability Class 2) 202 are cultivated land and 10 are actively cultivated. These quantities are included in the acreages given for the CAI and D routes but are omitted from the 401 route since in this case the switching station would be within the Wesleyville Generating Station site.
- 4(a) Because of the importance attached to agricultural activity in the area, an attempt has been made to analyze the farmland crossed by the four routes. Line 4(a) gives the acreage of land that is crossed by each route which falls in soil capability Classes 1 and 2 according to the Canadian Land Inventory. These figures are taken from a submission of Ontario Hydro dated February 14, 1975.
- 4(b) The figures for cultivated land acreage are taken from Table 1, page 240 of the OH/CAI report. They include the categories of "active agriculture" and "tobacco" that appear under agriculture in the table but omit the "non-active agriculture" and "pasture" classification. On route sections such as 401 South that were not in the original OH/CAI study Ontario Hydro have obtained the acreages by photo interpretation on the same basis as those in the report. The aim was to include in line 4(b) not only land currently under cultivation but all land that appeared from the air photos to have been cultivated at any time in the past.
- 4(c) Both by field inspection and from the examination of air photographs, it is apparent that a considerable portion of the land described in line 4(c) is not being actively cultivated at pre-

sent. In order to get a measure of the actively cultivated land, Ontario Hydro examined new air photos taken in 1973. The figures in line 9 are acres of land that were actively cultivated at the time these photographs were taken.

- 5(a) Acres of forest woodland are taken from Table 1, page 240 and 241, of the OH/CAI main report. For routes not included in that report, Ontario Hydro supplied comparable figures also obtained from an interpretation of air photographs. This acreage includes all forest cover with trees having at least 25% crown cover (OH/CAI, page 231).

THE FINAL SELECTION

The task of identifying a preferred route among such a wide variety of not easily comparable alternatives is obviously difficult. Everyone in the study area who appeared before or wrote to the Commission expressed either general or locally specific opposition to the building of the lines. There may well be a few in the area who, for economic reasons, would welcome a line over their property; if so none of them appeared to express this view. The problem therefore becomes one of identifying the "least worst" route for the lines. Unfortunately, no one route stands out as the best or the worst in every respect. Each of the many alternatives has something to be said for it and something to be said against it. The factual material in Tables II and III which represents a careful effort to select out important and relevant statistics as an aid to judgement does not lead to an obvious and inevitable conclusion. Even I, as Commissioner, having read all the reports and submissions and listened to all the testimony and argument, have reached a final decision that must inevitably be based to a considerable extent on subjective judgment.

However, I can assure all those who so generously and ably assisted the Commission in trying to find the right solution that their contributions have been not only welcomed but very carefully considered. If the route I have recommended to the Government is not in accord with the advice of a particular individual or group, it is not because I did not listen to and carefully consider that advice. Rather it is because I felt that in viewing all the evidence together, other factors have out-weighed those specific views.

The "Commission" Route

The "Commission" route which is shown on Map 3 follows the OH/CAI recommended route, with some minor variations, from the Lennox Generating Station north past Mount Pleasant Junction, then west to the vicinity of Osaca and then south to the Wesleyville Generating Station. From there it follows a modified "401 South" route between the Wesleyville and Darlington Generating Stations and then the OH/CAI recommended route from the Darlington Generating Station to the Oshawa Transformer Station. The scale of this map is such that it should be possible for every landowner to know whether his or her property is involved, but the detail is not sufficient to describe exactly the nature of the involvement. This has been done deliberately because Ontario Hydro is quite prepared to adjust details of location where possible to suit the wishes of local landowners. In the description that follows emphasis is given to reasons for the Commission favouring this route and also to any preferred deviations from the original OH/CAI recommendations.

General Comments on the Alternative Routes

The Gatineau Route

Logically, the Gatineau route must be considered first because if it were accepted it would replace all the other alternatives in their entirety. I have rejected the Gatineau route primarily because of its length. Increased length means increased cost, the occupation of more land, the taking of more houses, increased loss of energy during transmission and remoteness from possible future generating stations and present load centres.

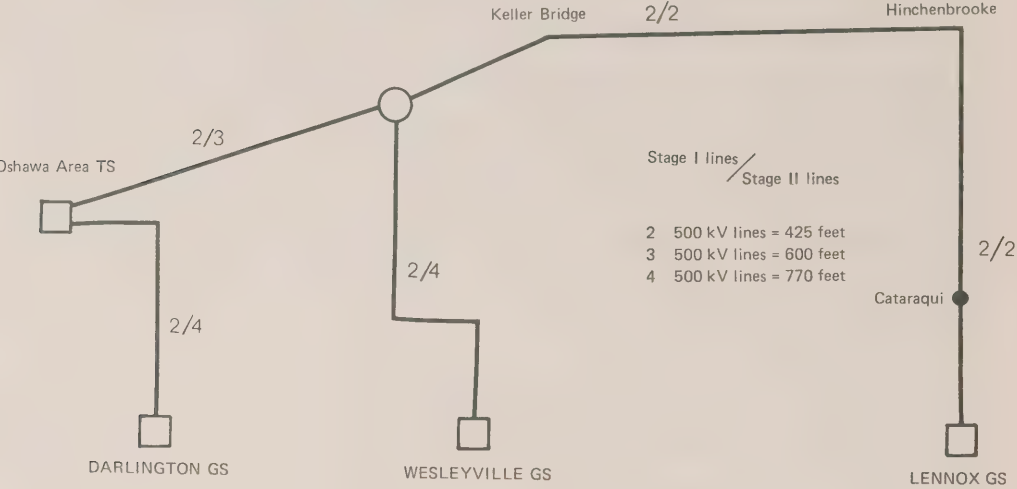
The Gatineau route by way of Hinchinbrooke is 184 miles long (route miles). This is 60% longer than the Commission route which, at 117 miles, is the shortest of the alternatives. Even the alternative use of the Gatineau route by a line from Lennox north through Mount Pleasant, which received very little public support and which involves the location of a great deal of new right-of-way, is 159 miles long or 40% longer than the Commission route. Most of the other relevant factors are in-

creased directly in proportion to this route mileage but there are two notable exceptions. The number of residences and farm centres, which is given as 43, is higher than for any of the other routes even in proportion to mileage. This is explained by the selective building of homes along the edge of and within the Gatineau right-of-way. This total number is a little uncertain because the exact number of buildings that would have to be removed would depend to some extent on detailed engineering prior to rebuilding, but at best the number will be excessively large. The second exception is that, as would be expected, the area of cultivated land on the Gatineau Route is substantially lower in proportion to total acreage traversed than on any of the others. This is obviously because a considerable mileage in the eastern part of the line is on the Laurentian Shield.

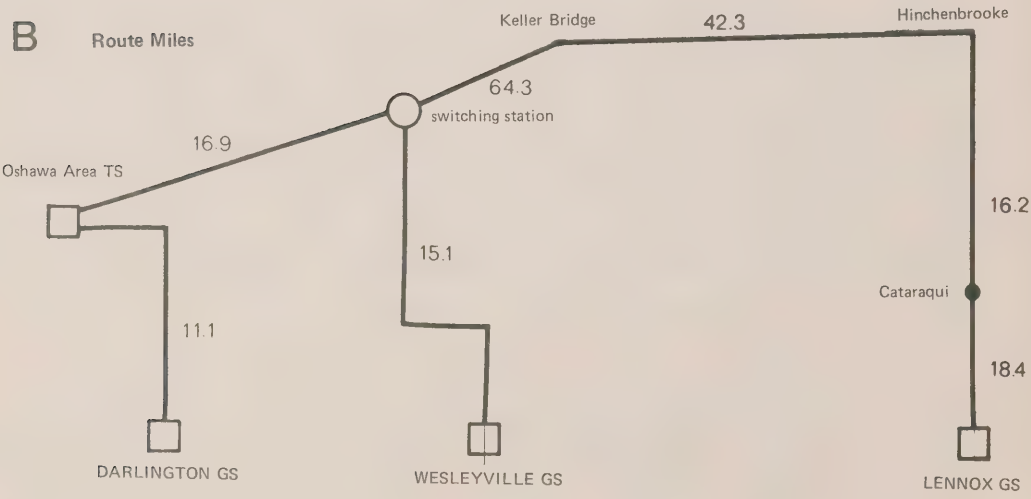
The mileages and other comparative figures given for the Gatineau route are based on Ontario Hydro's plan for rebuilding the Gatineau right-of-way, in order to accommodate part of the area needed for the new 500 kV lines on the existing 230 kV right-of-way. If this were not done the area of land occupied in the final construction would be very much greater. The rebuilding would be quite expensive and would have to be done in at least three stages in order to avoid interruption of service on the existing 230 kV lines. This would be very disturbing to the residents of the area. In a report presented to the Commission in October 1974, Ontario Hydro estimated the total additional cost of using the Gatineau-Keller Bridge-Hinchinbrooke route as being between \$84 and \$99 million more than the OH/CAI recommended route. This difference was made up of \$50 million for the added length of transmission line, \$18 million as the capitalized value of the transmission losses on the increased mileage, an extra \$1 million for property costs and \$15 to \$30 million for rebuilding the 230 kV lines. It would be cheaper not to rebuild the lines even though this would result in a total right-of-way ranging from 900 to 1,500 feet wide. This width, however, would be particularly difficult to justify at the western end of the line where the

Figure 5
The Gatineau System (Hinchbrook)

A No. of 500 kV Lines and Right-of-way Widths.



B Route Miles



route traverses good farmland. There is no doubt that the Gatineau route is attractive because it does, especially in its eastern section, traverse a part of the Laurentian Shield that is useless for farming and not especially attractive for recreational use except in a few isolated sections.

Ontario Hydro testified that from a system security point of view, the Gatineau route was extremely unsuitable since each of the generating stations has only a single egress route connecting into the main transmission system and in each case this egress is quite long (Lennox Generating Station 18.4 miles to Cataraqui; Wesleyville Generating Station 15.1 miles to Manvers Switching Station; Darlington Generating Station 11.1 miles to Oshawa Area Transformer Station). Should the proposed Central Lake Ontario Station which is included in Stage III ever be built, it would have a single egress route 40 to 45 miles long.

The OH/CAI Route – Lennox to Osaca

If the Gatineau route is ruled out it follows that one of the OH/CAI alternatives must be selected from the Lennox Generating Station to the vicinity of Osaca just north of the Wesleyville Generating Station, since in this area no other possibilities were presented to the Commission. This portion of the route is described in adequate detail in the review of the OH/CAI report given on pages 39 and 40 of this report. For those who are interested in greater detail, the route is shown on Map 1 from which can be read Concession and Lot numbers. This portion of the route was the subject of many written and oral submissions to the Commission and there was very active discussion of many of its features. After considering all this input I decided that it would serve no useful purpose to include the analysis in this report, since there seemed to be no decisive consensus in favour of any one of the alternatives to the OH/CAI recommended route.

The Commission therefore chose the OH/CAI recommended route from Lennox to Osaca with some minor variations described below. The reasons why

OH/CAI selected the route are given in considerable detail in their report. However, the Commission did not immediately accept these reasons but attempted to make an independent decision as the result of the evidence presented to it at the public hearings.

No route can be selected on a township by township basis, since there are some overriding constraints that tend to govern general location of the whole line. Of these, the most important is the crossing of the Trent River.

Three alternative overhead crossings of the Trent River were described in the OH/CAI report and all of them were examined carefully by the Commission during public hearings. The most southerly crossing just south of Batawa was chosen because it has the lowest visual impact, since the river is quite narrow at this point and drumlins on the west side will help screen the towers. An existing pipeline right-of-way and a sewage treatment plant have already created visual disruption. In addition, the southerly crossing does not interfere with the proposed recreational and residential development which lies north of it along the edge of the Trent River. The central crossing was rejected because it would seriously disrupt plans for the amalgamation of Frankford and Batawa and would be much more disturbing visually. The most northerly crossing of the river is very scenic and the banks would have to be cleared of trees and towers placed on Sills Island in the middle of the river. It is also close to a small airport. Both the north and central crossings would require the removal of homes. Thus the balance of opinion and of fact in favour of the southern crossing was substantial. (The possibility of crossing the Trent River by means of a combination of underground and underwater cable was proposed but has been rejected for reasons given on page 124.)

Having accepted the southern crossing of the Trent, the most southerly of the potential crossings of the Moira seems to fit best and this leads in turn to the selection of the southern route (A on Map 1) across

Thurlow, Tyendinaga and Richmond Townships. From the Moira to the Trent the most northerly route is ruled out because it cannot reasonably be reached from either of the selected crossings. Two possibilities remained: a northerly one in Concession IV of Sidney Township and a southerly one paralleling the Trans Canada Pipeline in Concession III. After careful consideration the combination of the two routes selected by OH/CAI was confirmed. This follows the more northerly route in Concession IV from the Moira to a point just east of Wallbridge where it turns south to join the route in Concession III. This selection was made because in the eastern section the southerly route traverses the planned development area of Belleville while in the western section the northerly route in Concession IV crosses an upland plateau with steep slopes on the east and west, thus increasing the visibility of the line. In addition the plateau is actively cultivated. Some residents in the area presented a petition supporting the use of the unopened road allowance to the north of Concession IV.

The choices from the Trent River to the Wesleyville Generating Station were more difficult because there is little to choose between the alternatives. An effort was made to avoid homes and to reduce the impact on agricultural land without unduly increasing the impact on forests and other natural features. Visibility was a very important concern but unfortunately none of the routes provides much natural screening for the line. Probably the most difficult choice was between the north and central routes in Cramahe Township. The central route was rejected because in Brighton Township it runs for some miles close to and almost parallel with Cold Creek and as it enters Cramahe Township crosses the most significant part of the proposed Cramahe Hill Forest and Wildlife Area. Although the northern route crosses approximately twice as much actively cultivated agricultural land, including some tobacco land, it was chosen because of the serious environmental effects of the alternative. The location of the route in Cramahe Township was the subject of opposing briefs and petitions. A proposal to use a more northerly route through Concession IX of Cramahe aroused strong opposition and resulted in a counter-petition from the residents of that Concession.

Alternative Routes from Osaca to the Oshawa Area Transformer Station.

Having accepted the OH/CAI recommended route from the Lennox Generating Station to the vicinity of Osaca, three alternative routes remain under consideration in the area west from Osaca which includes Hope Township and the Town of Newcastle in which are incorporated the former Townships of Clarke and Darlington. These three groups of routes were discussed at the hearings and are portrayed in Tables II and III; all of them are easily defended and all had their supporters and opponents. They are described as follows:

- 1) the remainder of the OH/CAI recommended route from Osaca to Oshawa, which has a greater impact on active farming on land of high capability and a significant impact on rural estate development and recreation, especially skiing;
- 2) the OH/CAI alternative Route D, which was not selected by them because of its impact on farms and recreational areas. It can be taken as representative of the three "Ganaraska" routes described below;
- 3) the Highway 401 route, which I have selected not only because it is the shortest, but also because it runs in a utility corridor where land severances and development are already common, has much less impact on active agriculture, provides two egresses from each of the Wesleyville and Darlington Generating Stations which substantially improves the security of the transmission system, and will require much less expansion to serve future additions to generating capacity.

While each of these routes has the common base of the OH/CAI recommended route from Lennox to Osaca, to distinguish between them as is done in Tables II and III, each has been called as a whole by the name of its western segment because this is where the difference between them occurs.

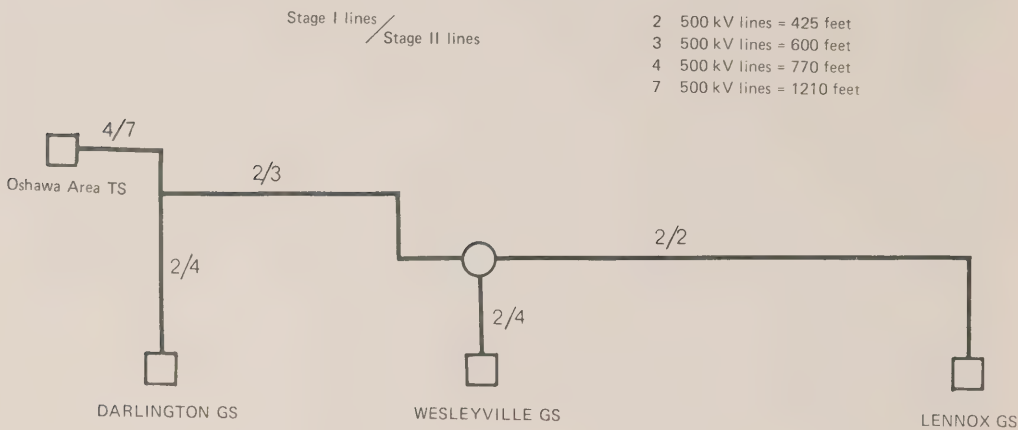
The OH/CAI Recommended Route – West from Osaca

The OH/CAI recommended route in the Town of Newcastle (Clarke and Darlington Townships) is shown on Map 1 and statistics for it are given in Tables II and III. It is a good route and is only 5 miles longer than the 401 route. In Stage I it has only 5 more line miles and will require the removal of 3 fewer residences and farm centres. The agricultural impact is slightly greater and the forest woodland crossed is 140 acres more than is crossed by the 401 route. The major disadvantages of this OH/CAI recommended route in comparison with the 401 route appear at Stage II. At this stage the OH/CAI route has 43 more line miles, 1,120 more total acres and has very much greater impact on agricultural land and on forests. In Stage II there would be seven parallel double-circuit 500 kV lines on the 3.4 miles of right-of-way leading into the Oshawa Area Transformer Station. This section of the right-of-way would be 1,210 feet wide and would provide a very unsightly conglomeration of towers. The terrain traversed by this alternative is particularly pleasant rolling country. Some of it has high agricultural capability; other parts are very suitable for recreation, particularly skiing; and most of it is attractive for rural estate development. It is obviously an area of substantial importance and one in which special attention should be given to preserving high class agricultural land. In a submission to the Commission dated April 26th, 1974 the Regional Municipality of Durham supported this route.

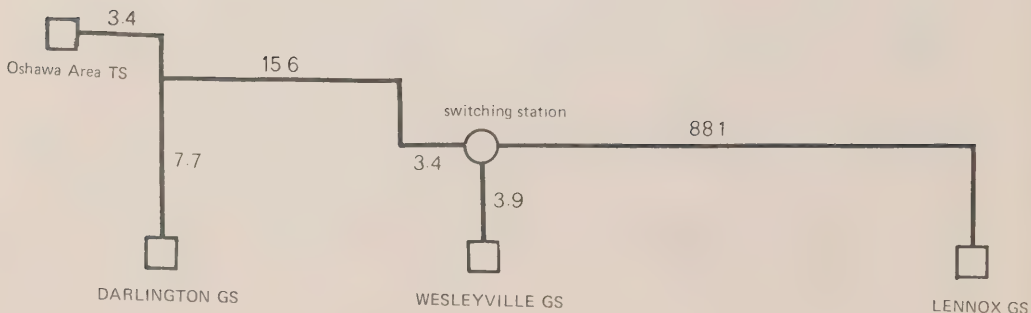
In the OH/CAI report an alternative route, labeled Route A on Map 1, which traverses Clarke and Darlington Townships further south is described but not recommended. The principal arguments against Route A given by OH/CAI were that although it parallels a pipeline for a good deal of its length it would create a long diagonal severance across Clarke Township and would have great visual impact: "With no natural backdrop to the south, the tower line would stand out against Lake Ontario and obstruct the view of many living on the higher land to the north and be visible to those living in other developing areas north and

Figure 6
The OH/CAI System

A No. of 500 kV Lines and Right-of-way Widths.



B Route Miles



south."³¹ In addition this line would require another switching station on the Darlington to Oshawa Transformer Station egress. This route received little public support except from the Sierra Club of Ontario which felt it would be slightly preferable for planning and environmental reasons. In a submission to the Commission dated April 26th, 1974 the Regional Municipality of Durham opposed this route.

In the OH/CAI report the width of the egress lines from both Darlington and Wesleyville was given as 900 feet for the short distance where provision was made for 230 kV lines and 715 feet for the remainder of the distance to the nearest switching station. This width of 715 feet was of course for Stage II when there would be 4 parallel double-circuit 500 kV lines in the right-of-way. During discussion with Ontario Hydro at the end of the public hearings, the system planners discovered that they had incorrectly specified 715 feet. The width should be 770 feet to provide what is called a "fall free" clearance between the two centre tower lines. (They would then be 230 feet apart instead of 175 feet.) The system planners consider that fall free clearance is essential where there is a single egress from a major generating station. Failure to provide the fall free gap in the centre of the right-of-way substantially increases the admittedly very small possibility that an accident might simultaneously sever all the lines out of the generating station. The additional 65 feet on each side will give space for one four-circuit 230 kV line and still be within the original 900 foot width.

The Ganaraska Routes – Route D

The Ganaraska Forest area is briefly described on pages 23 and 55 and further considered in the section on the panel convened by the Commission to discuss the Forest on page 125. Three possible routes through the area were described and are discussed here. However, since the discussion shows that Route D, taken from the OH/CAI

31 OH/CAI Summary Report, p. 41.

study is the best of the Gananaska routes, quantitative data are included in Tables II and III for Route D only. It is indeed an attractive route since it by-passes the excellent farming and recreational areas traversed by the OH/CAI recommended route in Clarke and Darlington Townships. On its northern leg it does traverse the edge of the Gananaska Forest in an area where there is a risk of both increased erosion and of interference with headwaters of streams leading into the Gananaska River. However, the route goes far enough north that as it turns west it is outside the forest and on relatively thinly settled farmland. As it passes along the Gatineau right-of-way, it is mainly on land of quite low agricultural capability until it approaches the Oshawa Area Transformer Station where it crosses some excellent farms. Table II shows that Route D is about 9 miles longer than the OH/CAI recommended route and 14 miles longer than the 401 route. The number of residences and farm centres taken at Stage I is the same as for the OH/CAI recommended route and three less than for the 401 route. Because of the longer mileage and more line miles, the total acreage occupied is greater. The acreage of Class 1 and 2 agricultural land traversed is smaller than for either of the other two routes, but the acreage of cultivated land traversed is equal to that on the OH/CAI recommended route but greater than on the 401 route. The acreage that is seen to be under active cultivation is the smallest of the three. The acreage of forest woodland is slightly higher than on the 401 route and the acreage of forest plantations is almost three times greater than on either the OH/CAI or the 401 routes.

Hydro estimates the cost of Route D at Stage I as being \$8 million more than the OH/CAI recommended route and \$16 million more than the 401 route. This estimate includes the cost of rebuilding all four of the Gatineau lines and since it might be possible to install the 500 kV lines without rebuilding more than 2 of the existing 230 kV lines, it may be slightly higher than it should be for comparative purposes.

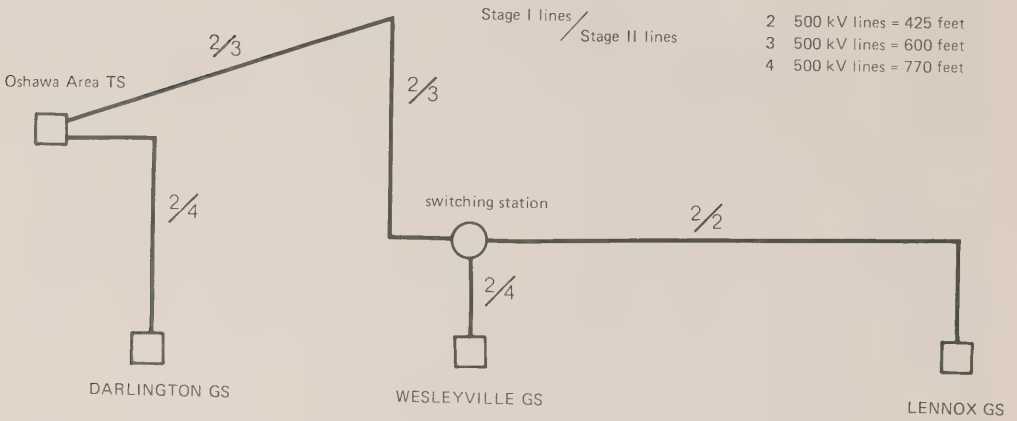
In Stage II Route D appears substantially less promising. Although route miles are unchanged it now has 60 line miles more than the 401 route; takes out four more residences and farm centres; occupies 1,600 more acres, including almost 260 acres more of Class 1 and 2 agricultural land, 940 more acres of cultivated land, 330 more acres of forest woodland, and 230 more acres of forest plantation.

Compared to Route D, none of the other possible routes through the Ganaraska area are serious contenders. The one suggested by the Ontario Federation of Agriculture would certainly reduce the impact on farmland but at the expense of extensive impact on forest, an increase in the risk of erosion and the possibility of interference with the water supply for the headwaters of the Ganaraska. In addition, since the route would run along a ridge in full view from Highway 35/115, the visual effect would be substantially greater than that of Route D.

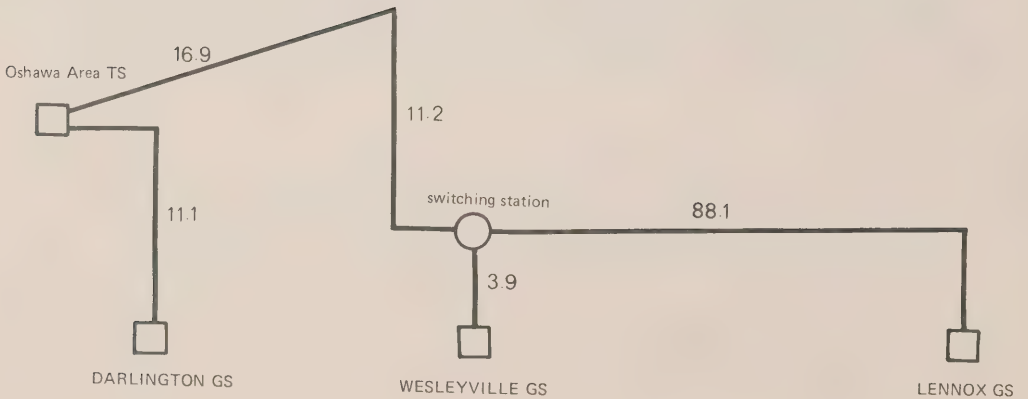
The alternative "Ganaraska" route described by Mr. Sparling was an attempt to run along the southern edge of the forested area in a zone that is neither good farmland nor well-grown forest. In the opinion of the Commission this was achieved, but it seemed to please no one. The western part of Mr. Sparling's route parallels the OH/CAI recommended route and traverses similar country with farms and rural estates and passes quite close to the towns of Leskard and Tyrone. Although it has some real advantages, they failed to outweigh those of the OH/CAI recommended route.

Figure 7
The Route D System

A No. of 500 kV Lines and Right-of-way Widths.



B Route Miles



The 401 Route – "Commission" Route

This route was first suggested to the Commission by a local resident, Mr. P. Giles, at the hearings in Port Hope on May 23rd, 1974. Because the first brief examination of Mr. Giles' proposal seemed so promising, the Commission decided to examine it more closely. I did not ask OH/CAI to do a further study using their complete methodology since the area had already been subjected to the initial stage of data acquisition, coding and computer study and only a detailed study of maps, air photos and on-the-ground visits were required to bring the information available on it up to the level reached on the OH/CAI recommended route. In order to do this, Mr. Tom Sparling was retained by the Commission to collect, organize and present the necessary data which were issued in a public report dated October 7th, 1974. Map 2 is taken from this report and shows two alternative routes described by Mr. Sparling. As a result of the Commission hearings in November 1974, the route designated by Mr. Sparling as 401 North was eliminated because it involves two crossings of Highway 401 and would seriously hamper the growth of the Village of Newcastle, especially to the north and northwest. The remainder of this discussion is centred on 401 South and it will hereafter, as previously, be called merely the 401 route.

The discussions at the hearings in November 1974 also led to a further refinement of the egress from the Wesleyville Generating Station. It is now recommended that the egress should emerge diagonally from the north west corner of the station site and proceed north west to a point approximately 1,000 feet south of Highway 401 (south west of the Texaco Service Centre on Highway 401). In this section it crosses over the Marydale Park and Wildlife Sanctuary which is a small privately owned park, then turns west parallelling the highway to Newcastle as described on page 58. The revised route is shown on Map 3.

Probably the most important advantage of the 401 route is that it puts the 500 kV transmission lines in a utility corridor. The strip of land

lying just north of the lakeshore between the Wesleyville and Darlington Generating Station sites was certainly not planned as a utility corridor but has in fact evolved into a quite compact one which varies in width from a mile to almost three miles. Within this width are located Highway 2 and 401, the main lines of the Canadian National Railway and the Canadian Pacific Railway and a 115 kV transmission line. Future development of the area will obviously be dominated by these existing linear land uses and so the addition of another linear system - the transmission lines - will have comparatively little impact.

Although the area was at one time mainly cultivated, it has now been so extensively cut up by all these utilities that much of the land is presently lying unused. There are still some excellent farms in the region including several orchards. (Ontario Hydro policy requires a minimum clearance of 15 feet between 500 kV lines and any trees. Since on flat ground the distance from the ground to the lowest conductor at the maximum of sag is 40 feet, this means that orchard trees can be up to 25 feet high at the point of greatest height restriction and that the interference with a normal orchard would not be serious except at tower sites.)

Except at Newcastle and Bowmanville there is surprisingly little development on the lakeshore. This is probably due to many factors such as the low temperature of Lake Ontario water even in summer, the lack of harbours which make access to the water difficult and the early construction of the railways which interfered with access to the lakeshore from the towns that were developing along the highway (Highway 2) which in this area is well back from the lake. Highway 401, the most recent and most dominant of the linear land uses in this area, has added a new and more serious obstacle to north-south development, further discouraging development along the lakeshore. This is particularly obvious in the case of the Village of Newcastle where Highway 401 has acted as a barrier to the southward spread of the village. The cottages along the lakeshore are connected to the village only by scattered

development rather than by the southward reach of the town that might have been expected if the highway and the railways had not been interposed.

Another very important advantage of the 401 route is that providing a direct link between the Wesleyville and Darlington Generating Stations makes possible the elimination of the single wide egress corridor from each of the two generating stations and replaces them by two separate but narrower egresses for each station. The Ontario Hydro system planners have repeatedly stated their preference for this latter layout and have emphasized the greater system security obtained by having two egresses going in different directions from a main generating station. In addition to this very substantial increase in system security, the 401 route makes it possible to move the Osaca Switching Station onto the Wesleyville Generating Station site, thus saving another 200 acres of land. This configuration also means that in Stage II the total line miles on the 401 route will be 43 less than in the OH/CAI recommended route. Another very substantial advantage is that for the last 3.4 miles leading into the Oshawa Area Transformer Station there will be only three 500 kV lines in a 600 foot right-of-way at both Stages I and II. With the OH/CAI recommended route at Stage I there would be four 500 kV lines in a 715 foot right-of-way and at Stage II seven 500 kV lines in a 1,210 foot right-of-way. In addition, at Stage II the right-of-way from the Darlington Generating Station north would be 770 feet instead of 600 feet.

Other advantages of the 401 route are portrayed in Tables II and III. Table II shows that even at Stage I the 401 route will occupy at least 290 acres less land than will any of the alternatives. At Stage II this difference becomes 1,130 acres. The same applies to the figures for Class 1 and 2 agricultural capability, except in the case of Route D at Stage I where the acreage of Class 1 and 2 agricultural capability to be occupied is slightly less than by the 401 route because all of Route D through the Ganaraska Forest area is on land of Class 4 or lower. This low soil capability is reflected in the smaller figure for actively cultivated land on Route D at Stage I. However, at Stage II the total

acreage covered on Route D is 70 acres higher. At Stage II, in comparison to the OH/CAI recommended routes the much smaller acreage of Class 1 and 2 soil capability (900 acres less), of cultivated (820 acres less) and of actively cultivated land (380 acres less) that is crossed by the 401 route, should be regarded, at least by the agricultural community, as a big advantage of the 401 route.

The figures for forest woodland are possibly of even greater importance because this category refers to relatively mature forests (at least 25% closed canopy) where the effect of even careful selective cutting will be noticeable. The effect of the transmission line on pine plantations is more severe because pines cannot be usefully pruned to limit their height. Nonetheless, this factor seemed to arouse very little concern among the public or even among foresters. Most people seemed to feel that any trees that were cut for the line could be replaced by plantation elsewhere. The same view certainly did not hold for mature hardwood forests which are so difficult to replace.

A further important advantage of locating the route of the transmission lines in the utility corridor in the vicinity of Highway 401 is that it puts them in an area that is already extensively committed to development of a variety of kinds and thus leaves open for the future options for land use which would have been foreclosed had one of the more northerly routes been selected. For example, the Ganaraska Forest area can continue to evolve into a major recreational area for the region. South of the forest can evolve into a choice area for rural estate development and for recreation, including skiing. The good agricultural land can remain in farm use uninhibited by transmission lines. Unfortunately, these rosy visions of the future depend upon land use planning and control. A cynic might suggest that it would be wiser to put the transmission lines over the best available agricultural land to protect it for farm use. On the assumption that more rational ways will be found to achieve this end, I have resisted the temptation to recommend that the lines be used for the protection of agricultural land.

Large heavily travelled, high-speed, controlled access expressways such as Highway 401 between Darlington and Wesleyville Generating Stations are very serious sources of environmental noise. The target set for residential areas is that the noise level should not exceed 56 dbA for more than 10% of the time. During periods of heavy traffic this noise level would probably be exceeded up to about 1,000 feet from the edge of Highway 401. In the absence of a land use plan it is not possible to forecast accurately future developments in the area. However, it seems likely that there will be some further residential sub-division. It is therefore reasonable, where this can conveniently be done, to put the transmission line in an area adjacent to Highway 401 where homes of any kind should not be constructed.

Only in the number of residences and farm centres that would have to be removed does the 401 route show any disadvantages in the categories described in Tables II and III. In Stage I the 401 route would take 2 more residences and one more farm centre than either the OH/CAI route or route D. In Stage II the 401 route would require the removal of 13 residences, the OH/CAI route 12 and Route D 16. In the case of farm centres, the 401 route requires the removal of 4 while the OH/CAI recommended route and Route D require 5 each.

Another disadvantage of the 401 route is that the transmission line would be seen by many more people. Not only is it in a more heavily populated area, but it would be seen by travellers on both railways and on Highways 2 and 401. The impact on travellers on the railways would not be serious because the proposed line would be close to the railways for less than half of the total distance between the two generating stations. The view from Highway 2 would not be greatly affected. It is the impact on Highway 401 that deserves careful consideration.

In the eastern part of the 401 route, where the lines would run close to and parallel with 401, they would certainly be visible but should not be too disturbing. The problem of fitting large structures such as these

162 foot towers, which tend to overwhelm the observer, comfortably into a landscape has engaged the concern of architects and engineers from the times of Leonardo Da Vinci to the present. As a result of these studies, a height-distance ratio of 1 to 3 has come to be regarded as satisfactory. Hans Blumenfeld writes:

At an angle of 27 degrees (height-distance ratio 1:2) the object appears, as Maertins puts it, 'as a little world in itself', with the surroundings only dimly perceived as a background: at an angle of 18 degrees (1:3) it still dominates the picture but now its relation to its surroundings becomes equally important: at angles of 12 degrees (1:4) or less, the object becomes part of its surroundings and speaks mainly through its silhouette.³²

Or to put it more directly - a comfortable viewing distance for a tall object is about three times its height. If the viewer is closer than this to the object, he feels overwhelmed by it. At and beyond this distance the object tends to be seen as an acceptable part of the landscape. For the 500 kV towers that are 162 feet high, the comfortable viewing distance would be 486 feet. The proposed 401 route east of Newcastle just meets this criterion and if it was felt desirable to put the line a little further away from the highway, this could probably be done at the cost of removing one more residence. In addition, existing trees could be left and others planted to provide a screen between the highway and the tower lines. The lake is not visible from the highway in this section and so the traveller does not tend to look particularly to the south where the towers would lie. There is no doubt that the tops of the towers would be clearly visible from the road but they would not be blocking any special view.

Unfortunately, this would not be true in short sections of the highway near Bowmanville where there are particularly attractive views of the

32 Hans Blumenfeld, The Modern Metropolis: Its Origin, Growth, Characteristics and Planning, M.I.T., 1967, p. 219.

lake and the lakeshore. At the present stage of development, the towers would be clearly visible and would tend to obstruct the view. This effect may well be reduced somewhat in the future by the construction of factories in areas that are now zoned for industry. The visual impact of the line in this section near Bowmanville is undoubtedly the most serious disadvantage of the 401 route. However, the advantages that have been outlined are so substantial that the Commission has no doubt that they outweigh the disadvantages.

In a memorandum to the Commission dated November 12th, 1974, Mayor Garnet Rickard, on behalf of the Town of Newcastle, vigorously opposed the 401 route and favoured a route through the Ganaraska Forest. His primary argument was that a transmission route would further divide an area that is already seriously divided by Highway 401 and the railways. He also argued that putting the transmission lines on a southern route would encourage the location of other utilities in the same corridor. Curiously enough, these are the same arguments that are used by supporters of the utility corridor concept to justify grouping utilities together. He also argued that the transmission lines would have a very serious impact on agricultural production in the area and would prevent the future development of agricultural land for industry. I have not lightly set aside Mayor Rickard's arguments but in spite of them have concluded that, on balance, the 401 route is the best.

In its final submission to the Commission, Ontario Hydro opposed the 401 route.³³ Their opposition was based on their view that there would be no significant cost savings, that the route would interfere to an unacceptable degree with the visual amenities of Highway 401, and would

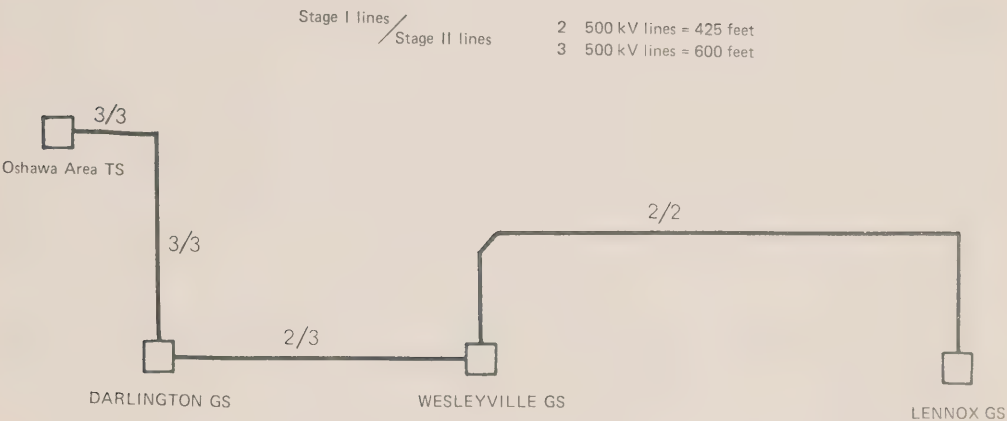
33 January 21st, 1975 submission of Ontario Hydro regarding briefs submitted to and oral evidence heard by the Commission.

interfere unduly with existing residential and industrial development in the areas of Newtonville, Newcastle and Bowmanville. In this submission, they do not list the advantages of the 401 route, particularly those that were emphasized by their own system planners. In spite of the negative attitude of the final submission, the Commission feels that if all the evidence presented by Ontario Hydro is taken together, it is certainly not adverse to the 401 route and might on balance be considered mildly favourable to it.

Figure 8

The 401 System

A No. of 500 kV Lines and Right-of-way Widths.



B Route Miles



Location of the Oshawa Area Transformer Station

The extension of the Parkway Belt which will contain Highway 407 has now been fairly closely defined as far as a point south of Markham. As Highway 407 and possibly the Parkway Belt proceed eastward from this point they will inevitably encounter the Ontario Hydro 500 kV transmission lines approaching the Toronto load centre from the east. Both Ontario Hydro and the Commission had discussions with the Ministry of Transportation and Communications and with Parkway Belt planners in the Ministry of Treasury, Economics and Intergovernmental Affairs to try to ensure that any location selected for the Ontario Hydro installations would leave as many options as possible open to the Highway and Parkway Belt planners. It seems most likely that the highway will go east through Concession VI of Darlington Township and then swing northeast toward the junction of Highways 35 and 115. The OH/CAI report considered two locations for the Oshawa Area Transformer Station, one in Concession V of East Whitby Township which would be approached by a line in Concession VI of Darlington Township, and another to the north in Concession VII of Darlington.³⁴ The northern site was chosen both in order to leave Concession VI of Darlington free for possible highway use and because it had been strongly supported by the Department of Planning and Development of the City of Oshawa in a submission of April 22, 1974 to the Commission. In addition the Regional Municipality of Durham planners asked that the route of the 500 kV transmission line should not continue west across the 230 kV transmission line in Lots 6 and 7, Concession VI of Darlington Township, but should instead turn slightly north at that point to follow the 230 kV transmission line to Lot 15 in Concession VII of Darlington Township and then extend straight west along the 230 kV line to the site of the Oshawa Area Transformer Station. The Commission studied this proposal with Ontario Hydro, and had it selected the OH/CAI route in this area, would have recommended this diversion. The selection of the 401 route requires no east-west lines in Concession VI of Darlington Township.

³⁴ Ontario Hydro 500kV Transmission Line Right of Way Lennox-Oshawa Environmental Report, p. 16.

Cost Comparison of Alternative Routes

Page 100 sets out Ontario Hydro's estimates of the cost of four routes: the Gatineau route via Hinchinbrooke, Route D, the OH/CAI recommended route, and the 401 route. The 401 route appears as the least costly in both Stage I and Stage II. Unfortunately, this comparison omits some additional costs, some of which are essential and others desirable. The essential additional costs include changes that may have to be made in the railway signal and communication systems where the railways pass close to or under the 500 kV lines. From past experience it is expected that the 500 kV lines will cause interference with these systems and it is known that technical solutions are available. Ontario Hydro has very roughly estimated that the cost for these changes might be from \$2 to \$4 million. They should be regarded as an essential part of the cost of the 401 route. The proposed route crosses property now belonging to St. Mary's Cement Company from which the company plans to quarry limestone to supply their cement plant. At some time in the future it may be necessary to move the 500 kV line to facilitate new quarrying operations. It is not possible to estimate when a need for such changes might occur or what the costs would be, though these will not be prohibitive, since the moving of at most 2 miles of line and the installation of some new anchor towers is all that will be needed.

ESTIMATED COSTS

Present Worth* in Millions of Dollars

	Gatineau via <u>Hinchinbrooke</u>	<u>D</u>	<u>CAI</u>	<u>401</u>
Stage I	240 - 255	188	180	172
Stage II	295 - 310	233	244	205

NOTES:

- 1) Estimates are from a memorandum dated January 7th, 1975 from Ontario Hydro to the Commission.

The table shows the estimated costs of the transmission facilities including lines, station and property costs. The costs include estimated escalation and the present worth has been calculated using an interest rate of 9%; costs of transmission losses have not been included. The difference in losses between the three alternatives other than the Gatineau are not considered to be significant. The two Gatineau alternatives would involve additional transmission losses compared to the others of \$12 million for the route via Mount Pleasant and \$18 million for the route via Hinchinbrooke.

The range of costs shown for the Gatineau alternatives is due to the assumed range of from \$15 million to \$30 million for the possible costs of rebuilding the existing 230 kV lines (depending on the number of circuits which must be rebuilt.

* Ontario Hydro defines Present Worth as follows: To compare alternatives where expenditures are made at different times the present worth of these expenditures in a specified year is computed. The present worth of a future expenditure or series of expenditures is the amount of money that should be invested in a specified year so that the money and the accumulated interest will be sufficient to pay the future expenditure.

- 2) The estimates for Route D include the cost of rebuilding all 4 Gatineau lines. As noted in the text, it may only be necessary to rebuild 2.
- 3) The estimates for the 401 alternative do not include an amount for the following:

- i) possible re-location of circuits on the St. Mary Cement Company property
- ii) re-location of railway communication cable circuits
- iii) possible use of steel poles instead of lattice towers.

These are discussed in the text. They would total approximately \$15 million for Stage I and \$20 million for Stage II, thus making the costs for the OH/CAI route slightly less than the 401 route for Stage I and somewhat more at Stage II.

- 4) The careful reader will have noted that the cost estimates given in this table are substantially lower than those given in the OH/CAI report and presented on page 43 of this report. As noted in the description of Stages I and II on pages 65 and 66 the OH/CAI costs are based on the assumption that there are generating stations at Lennox, Wesleyville and Darlington as in Stage I and that, in addition, a second generating station has been built at the Lennox site thus requiring the stringing of two additional 500 kV circuits from Lennox to Switching Station A and the addition of switch gear at both ends. In addition the OH/CAI costs were calculated for the distance from Mount Pleasant Junction to Oshawa only and omitted the cost of the 11 miles of line from the Lennox Generating Station to Mount Pleasant Junction. Therefore, to arrive at the correct Stage I costs, the OH/CAI costs given on page 43 must be decreased by subtracting the cost of stringing two circuits from Lennox to Switching Station A and of the added switch gear, and in-

creased by the cost of 11 miles of the complete route from Lennox Generating Station to Mount Pleasant Junction. Ontario Hydro have carefully re-checked these figures and assured the Commission that on this basis they are comparable.

The Selection of Towers

In previous hearings on the route for the Nanticoke to Pickering transmission lines the Commission heard extensive evidence concerning tower design. A citizens' committee that had been established by BHI Limited strongly recommended the use of "improved appearance" steel poles throughout the line. In its report to the Commission BHI Limited supported this recommendation. Ontario Hydro also recommended guidelines for the installation of improved appearance transmission structures which appear as Appendix A to the Commission's earlier report. The gist of these guidelines is contained in the following examples taken from that appendix:

Examples:

1. Improved appearance structures would be used for new overhead lines within established or definitely planned urban or suburban communities.
2. Improved appearance structures would be used for new overhead lines running parallel to main heavily travelled highways or parkways. Consideration will be given to the use of improved appearance structures at main highway crossings.
3. Improved appearance structures would be used for new overhead lines built through areas of special historical or scenic value, such as across the Niagara Escarpment.
4. Improved appearance structures would not normally be used for new lines built through rural areas.
5. In general, all tower lines on the same section of right-of-way should be of the same general design, e.g. all lattice type or all improved appearance such as steel pole.

6. Structures adjacent to new low profile type transformer stations should be of an im-

proved appearance to be compatible with the station.³⁵

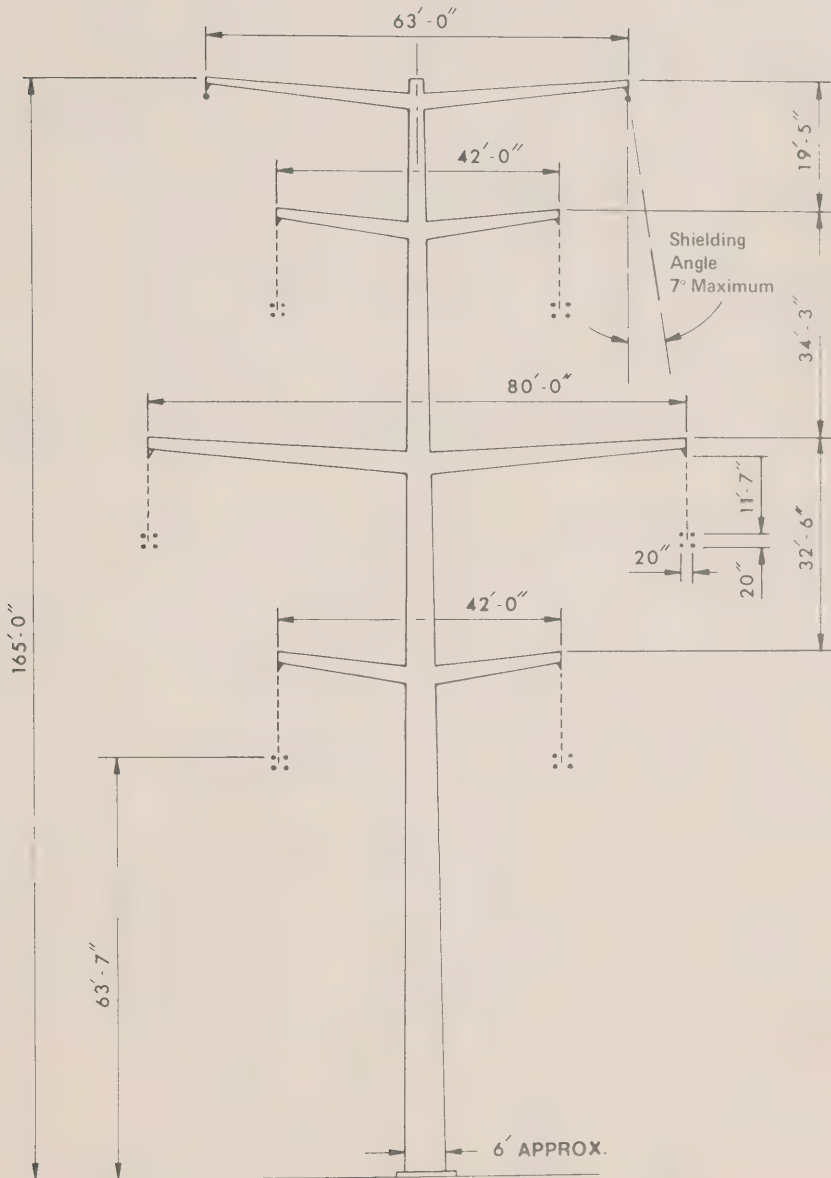
The Commission accepted the Ontario Hydro guidelines and used them as the basis for its recommendation on the selection of steel poles for the Nanticoke to Pickering lines.

According to these guidelines steel poles would not have been considered on the OH/CAI recommended route except at the crossing of Highway 401 near Mount Pleasant Junction. The OH/CAI report did not recommend the use of steel poles and as a result there was very little discussion of tower design during the present hearings. However, since the Commission route includes a section close to 401 and passing through a relatively built-up area near the Village of Newcastle where the Ontario Hydro guidelines recommend that single poles be considered, this has been done.

The single shaft steel pole that is shown as Figure 9 is considerably more expensive than the lattice tower shown at Figure 10. Table IV gives comparative costs for single poles and lattice towers completely installed. Steel poles are more expensive than lattice towers because they require twice as much steel, deeper foundations, more than twice as much foundation concrete and larger cranes for erection. If steel poles were used for the entire distance from the Darlington Generating Station to the Wesleyville Generating Station and for a short distance north of each of the generating stations at the crossings of Highway 401, this would include about 15 route miles, which implies 30 line miles for Stage I and 45 line miles for Stage II. Table IV shows that the additional cost of steel poles is about \$335 thousand per line mile giving a total additional cost of \$10 million for Stage I and \$15 million for Stage II. The table also shows that where angle or anchor structures

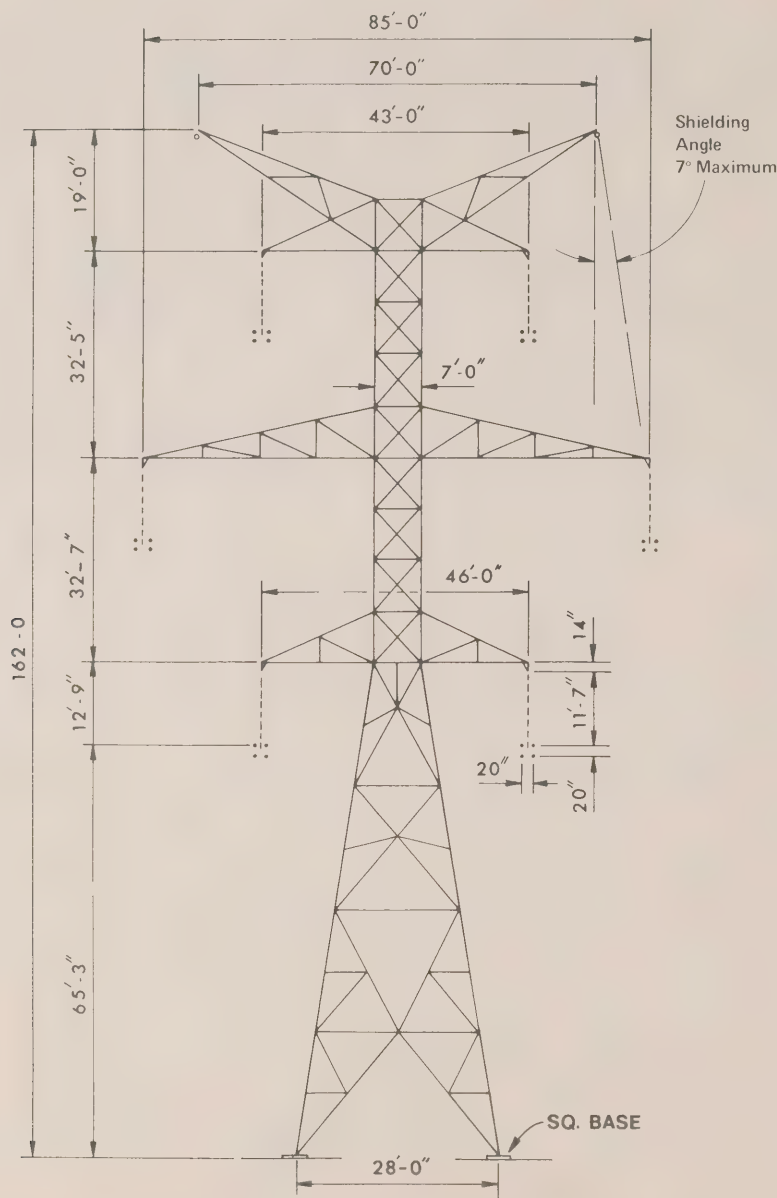
35 Report of the Solandt Commission "Closing the Generation Gap", A Public Inquiry into the Transmission of Power Between Nanticoke and Pickering, March 1974, p. A1 - A2.

Figure 9



500KV 2-CCT TAPERED TUBULAR SINGLE STEEL POLE STRUCTURE
 HEIGHT ABOUT 165'-0", WIDTH ABOUT 80'-0"
 COND BUNDLE OF 40.95" DIA WITH 20" SQ SPACING
 AVERAGE SPAN 900FT

Figure 10



500KV 2-CCT STEEL LATTICE STRUCTURE
VERTICAL CONFIGURATION WITH OFFSET MIDDLE PHASE
HEIGHT ABOUT 162'-0", WIDTH ABOUT 85'-0"
COND BUNDLE OF 4-0.95" DIA WITH 20" SQ SPACING
AVERAGE SPAN 900FT

Source: OH/CAI Environmental Report, p. 10.

are required at bends in the line the cost of steel poles is much greater than the cost of lattice towers. Until the detailed location of the line has been established, it is impossible to estimate the added cost from this factor. Two to three million dollars could be taken as a rough estimate.

An alternative would be to have steel poles only at the two crossings of Highway 401 and for 5 or 6 miles in the area south and east of Bowmanville where the lines would be seen prominently against the background of the lake. In the eastern part of the route where the lines would be in a more rural setting and could not be seen against the lake lattice towers would be acceptable. This would reduce the added cost by about \$6½ million in Stage I and almost \$10 million in Stage II.

Unfortunately, the selection of towers was not discussed at the Newcastle meeting where the people who would be most affected were best represented. However, it seems unlikely that further discussion there would have influenced my present advice. From past experience I believe the majority of the audience would have been willing to support additional expenditure in order to reduce the visual impact of the lines. Also, as in inevitable at such hearings, the much more numerous non-resident users of Highway 401 were neither present nor represented. The task of trying to balance cost against visual amenity is a very difficult one. The balance is still under active consideration by Ontario Hydro in connection with the Nanticoke to Pickering lines. It seems certain that similar consideration will be needed before a final decision can be reached in the present case.

Table IV
Comparison of Tower Types*
Approximate Costs

		Cost Per Structure	
		Lattice	Pole
i) Cost Per Mile, Straight Line, No Angles, Two Circuits Strung:	Suspension	\$ 40,000	\$ 95,000
	Light Angle	50,000	130,000
	Medium Angle	115,000	250,000
	Heavy Angle or Anchor	140,000	370,000
ii)	Type	Angle	

Note:

In a straight section of line, the main function of towers or poles is to hold the wires up, hence the term "suspension" structures. Where the line changes direction, additional lateral loads are imposed on the structure requiring heavier and stronger construction varying from light angle structures up to heavy angle or anchor structures that are used when the line is terminated or changes direction very sharply.

* 500 kV – Two Circuit – 900 Foot Spans

I recommend that steel poles be used for both the crossings of Highway 401 and for the entire distance between the two generating stations. If it is felt that the reduction in visual impact attained is not worth the expenditure involved, the steel poles could be used for the two crossings of Highway 401 and east from the Darlington Generating Station to a point just east of Newcastle where a transition to lattice towers could be made with the lattice towers continuing into the Wesleyville Generating Station. There is little doubt that the steel poles would be more acceptable to the travelling public, but even if it were decided not to use them it is my view that the visual impact of the line will not be overwhelming.

If steel poles are used for the crossings of Highway 401 on the egresses from the Darlington Generating Station and the Wesleyville Generating Station then obviously the question will arise as to whether or not they should be used where the transmission line crosses Highway 401 just north of Mount Pleasant Junction near Napanee. After careful consideration I recommend that lattice towers be used at this crossing. The transmission line crosses the road at right angles in flat, open farm country of a kind where lattice towers are generally deemed to be acceptable, if not preferable. I do not think that a change from towers to poles and back to towers for a short distance where the route crosses the highway would reduce the visual impact of the crossings enough to justify the expense.

Observations on the "Commission" Route

The Lennox Generating Station to Mount Pleasant Junction

Prior to the CAI study Ontario Hydro had selected and begun to acquire a right-of-way from the Lennox Generating Station north to the vicinity of Mount Pleasant Junction. Early in the Commission hearings the Ministry of Natural Resources objected to the location of this route. Ontario Hydro has indicated that the route has been re-located to the east, does not cut across the Hay Bay Marshes and crosses the Napanee River well east of its mouth where it is much narrower. Ontario Hydro feels and the Commission agrees that an underwater crossing of the Napanee River would cause more impact on the environment than would a standard tower span crossing the river. Of the 44 properties involved in the 11 miles between Lennox and Mount Pleasant Junction 37 have been purchased and 7 remain to be settled. These await only expropriation proceedings to settle the price but this will not be done until the complete Lennox to Oshawa route is approved by the Government.

Tower Location

Throughout all the proceedings of the Commission, attention has been focused on the location of the right-of-way. When the Commission route or some modification of it has been approved by the Cabinet and Ontario Hydro is ready to proceed, a very important stage of refinement of the route begins. Minor changes can be made in the exact location of the right-of-way to meet the wishes of individual landowners and larger changes can be made where several landowners agree on a change. Towers will generally be spaced 900 feet apart and towers on parallel lines will be placed in line abreast. However, Ontario Hydro testified that towers could be moved as much as 150 feet one way or the other along the line and that where necessary towers in adjacent lines could be staggered. The intelligent use of this flexibility can greatly reduce the impact of the line not only on farms and homes but to an even greater extent on streams, marshes, woodlands and other important natural features. Special care is required to protect the headwaters of streams to avoid the erosion that would put silt into streams and to avoid the removal of

vegetation that would result in a temperature rise in streams that are now cold enough to support trout. In most cases all of these hazards can be avoided completely by the proper placement of both the towers and the access roads to the tower construction sites. Ontario Hydro has indicated that they will exercise great care in the siting of towers, construction and access roads and all other works throughout the length of the route. However, there are some places that are of particular concern either to local residents or to environmentalists. The most important of these, arranged by townships from east to west, are:-

Richmond Township - The route traverses a corner of the Hempfly Marsh. Care must be taken to locate the towers to lessen the impact.

Tyendinaga Township - The route crosses the Salmon River at right angles and only the north side of the river is heavily treed. With careful selective cutting the impact of the crossing will be small. West of the Salmon River the route traverses two major wood lots on Blessington Creek.

Thurlow Township - The lower part of the Moira River is heavily built up so that possible crossing points are few. The one selected appears to be the only one between Foxboro and Belleville that would not require removal of homes. The crossing point is heavily wooded but with careful selective cutting this would help to screen the lines. The major problem is to design the crossing to have the least impact on adjacent landowners along the river.

Careful choice of the exact alignment will reduce the effect of the route on the two main wood lots and a marsh in the central part of the township.

Sidney Township and the Crossing of the Trent River - The selection of a route through Sidney Township was difficult.

The route selection was constrained by the crossing of the Moira to the east and of the Trent to the west. In the section of the route in Concession IV between Wallbridge and the Sidney/Thurlow Township line, several landowners asked that the line be moved further north to lot lines at the rear of their properties. Others were opposed so the Commission has not recommended this change. However, Ontario Hydro will be prepared to discuss detailed alignment with the group of landowners affected. Tower sites between Lots 27 and 38 of Concession IV and especially on the Bergveld property must be selected with great care to minimize the effect on farming operations. Towers must also be sited along the Trans Canada Pipeline to achieve maximum screening by the drumlins and forested areas and the utmost care must be taken to reduce impact on the Johnstown Drumlin Forest.

If the crossing of the Trent River south of Batawa is well designed it should be relatively unobtrusive. The river is quite narrow at this point and drumlins on the west side will help screen the towers. An existing pipeline right-of-way and the sewage treatment plant have already created visual disruption. Parks Canada has expressed a willingness to aid in reducing the impact on visual quality and park use (see also page 124).

Murray Township - Care must be taken in the siting of towers on the lengthy diagonal severance from Lot 3 Concession IV to Lot 9 Concession VI and especially at the crossing of Cold Creek.

Brighton Township - Special care must be taken where the line drops over the steep edge of an upland plateau, the westerly slope of which is highly visible from Highway 30.

Detailed siting will permit the line to pass the Codrington Fish Hatchery and Bird Rearing Station without difficulty. As the line passes from Brighton Township to Cramahe, consideration should be given to moving it somewhat further south in the vicinity of Lots 9 and 10, Concession VIII. Such a move will place the route lower on the south face of Cramahe Hill. This move was suggested by local landowners and was accepted by Ontario Hydro, so a generally acceptable alignment should be possible.

Cramahe Township - In Cramahe Township the choice of route was extremely difficult. The OH/CAI northerly alternative which was accepted has less impact on natural systems than either of the other alternatives but more impact on productive farmland. However, this effect can be greatly reduced by careful siting of the towers.

Haldimand Township - Care must be taken to reduce the impact on the woodlands and sandy erodable soil of the Northumberland Forest Reserve; the impact on Lots 7 and 8, Concession VI (the Webber property) and on the wetland area forming the headwaters of Baltimore Creek. In several locations towers must be sited to minimize conflict with tobacco farming operations.

Hamilton Township - No special problems.

Hope Township (to the Wesleyville Generating Station) - The Township of Hope has particularly asked for a change in the route originally proposed by OH/CAI in the vicinity of Osaca where the east-west line meets the egress line from the Wesleyville Generating Station. The Commission concurs in the Township's request that at Lot 22, Concession V, the route should now "proceed south-westerly to meet the north-

south line out of Wesleyville . . . These two lines would meet in the centre of the fourth Concession."³⁶

Other locations where special care is required include the crossing of a prominent hill southwest of Rossmount in Lot 4, Concession V, the crossings of the Ganaraska River and its tributaries, woodlots along the egress from Wesleyville and the crossings of Highway 2 and of Highway 401.

Hope Township and the Town of Newcastle (the Wesleyville Generating Station to the Darlington Generating Station) -³⁷
The problems of this section of the Commission route differ from those of the other parts of the Lennox to Oshawa route. This section traverses an area already affected by a diversity of mixed urban and rural land uses where the original land holdings have been extensively severed by highways and railways. In such an area it is impossible to determine a final alignment and to select tower sites without detailed local evaluation. An urbanizing area is dynamic, so not only existing land uses but also those which are being planned must be considered. In the case of the Town of Newcastle a new plan is being prepared now so it should be possible for the proposed right-of-way to be adopted as an element of the new plan. The Commission route has been selected on the basis of information available at the time of writing, but the final alignment of the right-of-way may differ somewhat from that now proposed as a result of more detailed evaluation and local co-ordination with Ontario Hydro. Areas that require particular care are: the diagonal egress from the Wesleyville Station which crosses the Marydale Park and Wildlife Sanctuary and a ridge to the west

³⁶ Hope Township Planning Board, October 28th, 1974

³⁷ Within the Regional Municipality of Durham the former Townships of Darlington and Clarke are incorporated into the Town of Newcastle.

of the Hope/Clarke Township line; the crossing of the Village of Newcastle in the vicinity of farm and orchard operations; the crossing of Foster Creek and Walton Park and the crossing of Bowmanville Creek and its associated development. Planning of the exact alignment over the property of the St. Mary's Cement Company must be co-ordinated with the company to minimize both present and possible future interference with their operations.

The Town of Newcastle (Darlington Generating Station to the Oshawa Area Transformer Station) - Impact of this section of the route on both homes and farms is substantial but there appears to be no acceptable alternative.

DISCUSSION

Review of Ministry Submissions

In selecting the route for a new high voltage transmission line the basic environmental study must be supplemented by at least four identifiable sources of information which must be effectively represented at a commission of inquiry before the commission can feel that it has made an adequate search for relevant information. These are:

- 1) Ontario Hydro and its consultants, who make their presentations from a base of professional expertise and accumulated experience;
- 2) the general public, especially those in areas that may be directly affected by the route. They have a wealth of detailed local knowledge to contribute;
- 3) organizations representing special sections of the community. They range from such large well-established and professionally operated groups as the Ontario Federation of Agriculture, the Federation of Ontario Naturalists and the Sierra Club of Ontario to recently formed and often evanescent groups of locally concerned citizens. They too have a wide range of knowledge and experience to bring to bear on the problem and can often be more objective in their presentations than the local landowners who are directly affected; and
- 4) provincial government ministries. In the present stage of evolution of land use planning and control in Ontario both knowledge and power centre in the provincial government. Policy statements indicate that as guidelines are laid down responsibility will be decentralized to regions and municipalities; in the present stage of transition, however, the influence of the provincial ministries is dominant. This means that their contribution of knowledge, particularly about future land use plans and controls, is absolutely vital to the proceedings of a commission such as this one. At the earlier hearings of the Solandt Commission it was difficult to induce ministries to state firm views on any proposal and particularly to have senior ministry offi-

cials appear and discuss proposals in public. This reticence both at the ministerial and at the official level is understandable. In our democratic society the final approval of a selected route must inevitably be made by the Provincial Cabinet. In an ideal world the officials in every ministry which might be concerned would communicate effectively with each other, would eliminate their differences of opinion by sensible compromises and would give their respective ministers completely co-ordinated advice. When the Cabinet then met to make their decision they would find no cause for disagreement. Anyone who has ever worked in government will realize that this state of perfection is scarcely ever approached even in the best run governments. Officials are too busy to communicate effectively on every subject. The genuine concerns of individual ministries are often in direct conflict and the politician, being concerned with the "Art of the Possible", often feels compelled to make compromises that are not fully supported by the carefully prepared data of the expert.

I therefore feel strongly that if a Commission of Inquiry such as this one is to do an effective job the individual specialists in the important ministries must feel free to make written submissions to the Commission or to appear before it to present views based on their own experience and on the concerns of their particular ministry while fully recognizing that these views may seem to be incompatible with those of other ministries. Neither the officials nor, more importantly, their ministers should feel any embarrassment from the public exposure of differences of opinion between ministries. These differences exist and it is part of the task of the Cabinet to arrive at sensible compromises in reaching a final decision.

Because of the great importance I attach to the contributions by the provincial government ministries and because I feel it is important to make clear my reasons for disagreement with a ministry's advice where this has happened, I have collected together comments on ministry submissions.

The Ministry of Agriculture and Food made written submissions to the Commission on April 25th and November 13th, 1974 and was personally represented before the Commission at hearings at Port Hope on June 5th and Kendal on November 13th, 1974. The Ministry was critical of the OH/CAI study methodology and of the contention in the study that a high voltage transmission line is compatible with agriculture. The Ministry consistently advocated a route through the Ganaraska Forest. The Commission's reasons for rejecting such a route are fully discussed in other sections. It is felt that the selection of the 401 route represents a substantial step toward meeting the Ministry's requirements.

The Ministry of Transportation and Communication expressed serious reservations regarding the computer techniques utilized in the OH/CAI study. In a letter of December 11th, 1974, they repeated this criticism and also expressed the view that "Mr. Sparling's report treats the alternatives rather superficially". They suggested further study of but not definite opposition to a route close to Highway 401. They expressed concern about possible conflicts between the route of the transmission line and the proposed Highway 407 (see page 98 of this report).

The Ministry of Industry and Tourism stressed the scenic importance of Highway 401, more particularly east of Port Hope.

The Ministry of Natural Resources, in a submission to the Commission in May 1974, outlined their main concerns which included the appearance of the lines relative to recreation and scenic areas; their effects on animal and fish populations; the desirability of avoiding the removal of trees; the effect on general production and extraction, particularly of sand and gravel; and the need to avoid crown land being managed for forest conservation and recreational uses. They suggested that the study should include possible routes along Highway 401 and on the Gati-neau right-of-way. They were critical of the computer methods used. The Ministry sent a further written submission to the Commission on October 28th and also spoke at the hearings on several occasions. They did not strongly oppose a route involving the Ganaraska Forest but expressed a

preference for a route in the vicinity of Highway 401 and reminded the Commission of the importance of avoiding interference with the Ganaraska area sand and gravel deposits that may be invaluable in the future.

The Ministry of Community and Social Affairs strongly advanced the view, supported by other ministries, that government ministries should be included much earlier in the planning process for the route of a new transmission line so that they could profitably assist in study area delineation, proposals for public involvement, etc. The Commission supports this view.

The Ministry of Consumer and Commercial Relations, Energy Branch, supported the idea of following the Trans Canada and Northern pipelines where possible and was generally in favour of a common service corridor though no specific mention of the 401 route was made.

The Ministry of Treasury, Economics and Intergovernmental Affairs, in a July 1974 submission, suggested further studies of the Gatineau and 401 routes and expressed dissatisfaction with the computer methods used.

The Ministry of the Environment has taken an active part in the work of the Commission both through two important written submissions and through the public appearances of its representatives. In a submission in June 1974, the possibility was advanced of an east-west route in a corridor in the general area of Highway 401 for the entire distance from Mount Pleasant Junction to Darlington. This possibility had been carefully examined by Ontario Hydro and CAI. On behalf of Ontario Hydro, Mr. John Sedgwick presented to the Commission at hearings at Port Hope and Newcastle the arguments against a route near Highway 401 in the eastern part of the study area and later submitted the text of his remarks. The text is available for anyone interested but has not been included in this report. Such a route is undoubtedly possible but it seems to have no advantages and many disadvantages when compared to the OH/CAI recommended route. The obvious and serious difficulties are: in getting past Belleville, in crossing the Trent River and in keeping reasonably close

to the highway in the stretch between the Trent River and Port Hope. For a great part of this distance Highway 401 lies along the old beach of Lake Iroquois and consequently the ground adjacent to the highway is high, rolling, scenic and difficult to traverse with a transmission line.

In its submission of June 1974 and in previous and subsequent testimony before the Commission, the Ministry of the Environment has expressed its conviction that the various alternatives and especially the Gatineau route have not yet been adequately studied. They feel that the probability of finding a better solution to the various problems of a transmission route between Lennox and Oshawa is so high that action should be deferred pending further study. In order to avoid "locking in" the generating capacity at the Lennox Station during the study period, they propose the immediate construction of a 230 kV line from Lennox to Ottawa. This proposal is advanced on the ground that the Ontario Hydro long range plan indicates that a 500 kV connection from Lennox to Ottawa will be needed in the very near future.

In Ontario Hydro's final submission to the Commission³⁸ this suggestion is rejected on two grounds. First, it would certainly take at least two years to obtain route approval for a line from Lennox to Ottawa and a further three years to build the line. Since all four units at Lennox will be fully available for commercial operation by early 1977, the line could not be built in time to avoid locking in of power at Lennox. Second, in a letter to the Commission dated January 17th, 1974 which appears as Appendix A of Ontario Hydro's final submission, Mr. G.B. Pearson, Planning Engineer, Bulk Power Transmission, says "we have considered this suggestion and conclude that even if this link were to consist of a 500 kV two-circuit line from Lennox to Ottawa, the resulting system would not provide sufficient capability to transmit the full power from Lennox into the system." The Commission accepts Ontario Hydro's arguments and recommends that the Lennox to Oshawa 500 kV line be built as soon as possible.

38 Ontario Hydro submission regarding briefs submitted to and oral evidence heard by the Commission, January 21st, 1975.

Parks Canada, the agency of the Federal Ministry of Indian Affairs and Northern Development which is responsible for administering the Trent waterway as a national park, endorses the preferred crossing of the Trent River as having the least impact on the river system and on land and water resources.

Parks Canada and some members of the public supported the use of underground cable for the crossing of the Trent River for purely aesthetic reasons. Ontario Hydro opposed this proposal not only because of the very high cost but also because the number of cables required to equal the capacity of the overhead lines would be very large and the construction of the trenches or tunnels needed to carry them under the river would cause extensive disturbance in the area. In addition the structures, including anchor towers, needed for the transition from overhead to underground transmission are bulky and expensive and would have to be put well back from the river crossing if any net aesthetic gain were to be achieved. The Commission therefore does not recommend installing cables under the Trent River.

The Ganaraska Forest Panel

During the public hearings many opponents of the more southerly routes proposed a route through or close to the Ganaraska Forest but no one appeared to defend the forest and to present a picture of the problems that might be encountered in putting a line through it.

It was decided, therefore, to convene an expert panel to present to the Commission and to the public a discussion of the significant aspects of the forest area. The aspects with which the Commission was particularly concerned were: the forest as a natural resource providing soil stability, protection of headwaters and timber harvests; the forest as a wildlife habitat and probably most importantly, the forest as a recreational resource.

The panel discussion took place on November 27th, 1974 in Port Hope. The panel members were Dr. Vidar J. Nordin, Dean of the Faculty of Forestry, University of Toronto, Chairman, Algonquin Forestry Authority and member of the Ontario Parks Advisory Council, who appeared as a general forest biologist to describe the forest itself and its significance; Dr. C.H.D. Clarke, a biologist retired from the former Department of Lands and Forests, Wildlife & Fisheries Branch, an honourary member and past-president of the Wildlife Society and an honourary member of the Federation of Ontario Naturalists, who appeared to discuss the wildlife and fisheries aspect of the forest; and Mr. Doug Sadler, a teacher of Outdoor Education, past-president of the Federation of Ontario Naturalists and a member of the Canadian Nature Federation, who appeared to discuss the relationship of man to the forest including the use of the forest for recreation. Ex-officio members were Mr. Roy Forrester, a publisher from Orono, who appeared to represent the Ganaraska Region Conservation Authority and both described the forest and spoke of its importance to the area and Messrs. Leslie McCoy and Ralph Lockhart, representatives of the Ministry of Natural Resources.

The Ganaraska Forest consists of 8,635 acres of woodland, mainly reforested, which is owned by the Ganaraska Region Conservation Authority and

Ganaraska Forest Area

Pontypool blow sand – erosion by wind, water and overgrazing.



managed by the Ministry of Natural Resources. The forest is located on light sandy soil on the Oak Ridges Moraine within Concessions VIII and IX of Clarke Township with smaller sections running into Hope, Manvers and Cavan Townships. The forest is approximately 8 miles long from east to west and $1\frac{1}{2}$ to 2 miles wide from north to south.

The decision to acquire the land and plant the forest arose from a study made in 1942 in co-operation with conservationists and the then Department of Lands and Forests. At the time of the study a considerable part of the area which had been cleared for farming had been abandoned and was being seriously eroded by wind and water. Port Hope was seriously troubled by repeated flooding of the Ganaraska River and it was considered that the loss of forest cover in the headwaters area was a major factor in aggravating the floods. Therefore, the main objective of the plantation was to control erosion and runoff and reduce silting with the secondary objective of the production of pulpwood and saw logs. At that time, while recreation was not considered to be of prime importance, it was certainly a factor in the decision to reforest the area.

As a result of the plantation program, the Ganaraska Forest area is now of very heterogeneous age and composition. There are small areas of mature mixed forest. About a thousand acres of what was originally the Durham County Forest contain plantations of red and white pine that are now more than 50 years old. The majority of the area is made up of red pine plantation dating from the early 1940's. In recent years the forest has been actively managed and so there are many areas of more recent plantation and a few areas of recent clear cutting where Scotch Pine have been removed to be replaced by Red Pine. At the edges of the area there are remnants of farm wood lots of very mixed age interspersed with pastures and very occasional crops. The original purpose of stopping erosion has been largely achieved although there are still a few places where it continues. The area is served by access roads built by the Ministry of Natural Resources to facilitate forest management and fire protection, and by trails for hiking, cross country skiing and snowmobile use.

Following the discussion at Port Hope, each of the panelists submitted to the Commission a brief summary of his statement. The general tone of their presentations is most easily portrayed by quotations from these statements:

Dr. V. Nordin

It is true that no Hydro route will satisfy all environmental considerations because of the many divergent interests of farmers, foresters, conservationists, not to mention the constraints in locating suitable generating sites.

Hydro planners therefore, must balance their decisions on Hydro routes so that there will be the least possible unfavourable impact on land use, aesthetics, and natural resources.

There are a number of cogent reasons why careful examination is necessary before considering a Hydro line through the forest proper:

- A 400 to 600-foot swath through a small forested area on sandy soils will certainly have an effect on the water-holding capacity of the area which serves as headwaters for all streams to the south draining into Lake Ontario.

Under such conditions I know that Ontario Hydro gives considerable care. Special remedial procedures would be necessary to effectively minimize the potential damaging effects of site clearing.

- Timber Values

Currently, about 1,500 cords are harvested annually . . . Timber values, however, would be part of a sum total of values of the forest plantations in considering a Hydro routing.

- Interference with Forest Wildlife and Fisheries

I do not believe that a Hydro line through the forest presents serious hazards to wildlife and fish provided, again, that remedial reforestation and other measures are taken . . .

- Aesthetic-Recreational Values

The forests of the Ganaraska watersheds have significant aesthetic-recreational values for the people of Ontario. The forests constitute an

oasis that is becoming increasingly attractive to recreationists for hiking, fishing, cross-country skiing, horseback riding, snow-mobiling, nature study trails, and orienteering.

We know the Ganaraska watershed forests provide a variety of portentous benefits. The question must be posed, and the implications carefully considered, should we endanger and risk significant forest values if a recommended Hydro route is available that will avoid them and, at the same time, not unduly compromise other values affecting agriculture, urban planning, historical and cultural sites?³⁹

Dr. Doug Clarke

The area now in reforestation was land that was more or less derelict. Wildlife does not thrive on poor soil. Even forest presents problems. You can have forest, and you can encourage wildlife, but on a really good area the wildlife does not have to be encouraged . . . However, there are certain soil types, especially Granby gleisols and Farmington, which are generally physically unsuited for both agriculture and forestry, yet are very rich in nutrients. They are the basis of the best Southern Ontario wildlife lands . . . There are literally no such soils in the forest area.

Most of the wildlife in which people are interested belongs to the early stages of forest growth, with good ground cover, and to the forest edge. The close-canopy plantation is indeed a biological desert. The power line promises to restore an early stage and freeze it.

Thus for wildlife in the forest a power line is unlikely to be bad, and could be good depending on expertise and investment.

The fisheries aspect is more significant. The moraine is a source of springs that feed trout streams. Such streams in Ontario are constantly declining both in number and quality. Much of

39 V. J. Nordin, Statement of Remarks to Solandt Commission, Port Hope, Ontario, November 27, 1974

this has been caused by drainage assisted by the government under an assumption that all drainage is good . . . Springs in the forest could be avoided by proper siting of structures and access roads.

Lastly, I am still concerned over the siting of the line west of the forest along the crest of the ridge. This will certainly kill birds, including ducks, moving between Lake Ontario and Rice Lake. Some migrants are killed along all power lines, especially . . . if they are [flying] in the dark or in fog. Skyline cables and towers may well be a real hazard. This seems not to have been taken into consideration.

In all of this the basic assumption has been made that the line has to go in the moraine area . . . A new corridor must be judged as much on the development that it is going to invite as on its own merit. It is likewise clear that from construction through maintenance, the quality of environmental impact is going to depend on the knowledge and concern of the personnel involved.⁴⁰

Doug Sadler

[The forest] was instituted to correct problems arising from improper land use - erosion and flooding, loss of production.

The major consideration of such areas is in the area of aesthetics or intangibles. These are highly important to people, especially in an increasingly urban setting. Our economically-oriented society tends to minimize this, though the emphasis is gradually changing.

The most southern route, although it lies through the most productive soils, is likely to be taken over for development within a few years. A Hydro right-of-way here could ensure a green belt of some relief value. Objections here include visual

⁴⁰ Comments of C.H.D. Clarke on the proposed Lennox-Oshawa 500 kV Transmission Line through the Ganaraska Forest, November 27th, 1974.

pollution in heavily travelled areas (but these are highly modified already); and loss of exploitive land values to some owners. This is not an important factor in the larger societal context.

. . . all factors affecting people [should] be given full weight. This implies far greater consideration of so-called intangible values, since these are the crucial ones for our quality of living, as against mere prosperity or even plain survival. These are not greatly in question in this matter.⁴¹

The public input at the panel discussion added little to the presentation of the panelists. The view of the agricultural community that the transmission line would do little harm and might do substantial good to the forest was reiterated. Several of the public testified to the extensive recreational values of the area. One of the most important presentations in this category was made by Mr. Lars Carlson on behalf of the new sport of orienteering. He exhibited the orienteering maps that have been prepared of the Ganaraska area and described how actively the area was being used by the followers of this sport.

The results of the panel presentations and discussion might be summarized as follows: the forest offers substantial and accessible winter and summer recreation to a large area where the urban and rural population is growing and available land is becoming scarce. The area is not an important wildlife habitat but the wildlife that is there adds substantially to the recreational interest. The construction of a transmission line through the forest, if done in the way described by Ontario Hydro would not detract from and would probably add to the value of the area as a wildlife habitat and not seriously reduce the total production of the forested area. The greatest danger from construction would be the possibility of increased erosion and of interference with the hydrologi-

41 D. Sadler, Impact on Ganaraska Forest Area, Presentation to the Solandt Commission re Lennox-Oshawa 500 kV Right-of-Way, November 27th, 1974.

cal regime in an area which is an important source of headwater to the Ganaraska River and other streams in the area.

The aesthetic effect of a transmission line would vary greatly with its location. A line along Route D to the north of the forest would not be particularly prominent since it would be below the height of land. A line directly through the forest would be very prominent from a distance since it is on high ground but would scarcely be seen by recreational users within the forest. A line along the route described by Mr. Sparling at the southern edge of the forest would be in full view from the lookouts in the south part of the forest but would probably not be prominent since in most cases it would be low enough that it would not be seen against the sky.

Land Acquisition, Final Route Location, Construction and Maintenance

The expression of public interest in the route for major bulk transmission lines occurs in two sharply divided stages. The first is the period during which the selection of a route is under discussion. Most of the present hearings have been devoted to this stage. The second stage begins when the Cabinet has approved a route and Ontario Hydro begins negotiation with individual landowners. Throughout the hearings Ontario Hydro has given a great deal of testimony about the policies and practices that will be applied in this second stage. Much of this testimony is mentioned in other sections of the report.⁴² This section is a brief summary of Ontario Hydro's testimony and gives references to Ontario Hydro publications explaining their policies and practices which are readily available to any landowner.

Land Acquisition

In the past Ontario Hydro has had an excellent record of acquiring land directly from owners at mutually satisfactory prices. However, because

42 Appendix A, Property Policies and Practices of Ontario Hydro, Presentation to the Solandt Commission, May 22, 1974.

of the extensive protection provided for the landowner by the new Provincial Expropriation Act, Ontario Hydro now prefers that all land be acquired by expropriation. Expropriation provides for the possibility of Hearings of Necessity in case the landowner objects to having his land taken and for arbitration and final reference to the Land Compensation Board to settle the price to be paid. In opting for expropriation rather than private settlement, the landowner does not commit himself to going through all these stages but he does retain the option of using the entire mechanism should he feel that he is not receiving equitable treatment.

Ontario Hydro now offers to the landowner the option either of selling title to the land or of granting an easement either for a one-time payment or for an annual rental. When Ontario Hydro purchases the right-of-way outright, allowance is made for various kinds of "injurious affection" including interference with farming operations during construction, reduction of the arable land still owned by the farmer to below the area that productively matches the nature and size of his farm buildings and other less common problems. Where an easement is purchased or leased, an extra allowance is made for the inconvenience caused by towers.

. . . the compensation for the first structure will be based on 75% of the value of one acre of land. This compensation will be increased by 5% for each succeeding structure. For example, compensation for the second structure will be 80% of the value of one acre of land, 85% for the third structure and so on. The minimum payment per structure will be \$100.00.⁴³

43 Appendix A, Property Policies and Practices, p. 159.

Final Location of Route and of Towers

In testimony before the Commission Ontario Hydro said that their practice is to have a man from their Property Department and a transmission right-of-way technician visit each rural landowner on at least three occasions before construction begins. The Ontario Hydro staff would have with them ortho-photos of the area at a scale of one inch equals 200 feet. These air photos are corrected for scale so they can be used as maps. Using these photos, the landowner and Ontario Hydro will be able to discuss in detail such things as the exact location of towers in fields. An attempt will obviously be made to put the towers where the farmer would like to have them, such as on lot lines or in hedge rows. Other subjects for discussion include the best access routes to the tower line, whether over existing farm roads or by new access roads either permanent or temporary, access to working fields during construction, avoiding interference with livestock, etc.

Ontario Hydro has indicated that in addition to these discussions with individual landowners it will gather small groups of landowners for discussions where appropriate. This will be necessary fairly frequently since the placing of towers on any one farm will in most cases affect the placing of towers on adjacent farms. Ontario Hydro will often be unable to give each individual exactly what he wants. For example, where some of the landowners wish the route moved a few hundred feet while adjacent landowners have different views, an acceptable compromise must be reached. A few such cases arose at the Commission hearings but it was obvious that there was no point in trying to reach detailed solutions of such problems until after route selection and approval were complete.

Construction

Ontario Hydro presented their latest practices in construction which include the careful selection of access routes to tower sites, keeping to a minimum the area affected by construction at individual tower sites, ensuring that there is as little damage to or removal of vegetation as possible and ensuring that soil from excavation for tower footings is removed or carefully disposed of in order to avoid covering adjoining top soil and so forth.

Where the route traverses wooded areas, Ontario Hydro uses advanced selective cutting practices.⁴⁴ As a result no wooded area will be denuded.

Restoration and Maintenance

Ontario Hydro described the methods used to restore construction sites either as nearly as possible to their original condition or to some other condition preferred by the landowner. In some cases a farmer may wish to have access roads left to improve his own access to his property; in other cases a farmer may prefer to have an area of scrub brush or poor woodland clear cut rather than selectively cut so that he can extend his area of cultivation. Ontario Hydro indicated that restoration would be highly selective and aimed at meeting the wishes of the local landowner. It would in many cases include planting of trees both as visual screens and to replace trees removed in the selective cutting.

Except in emergencies, Ontario Hydro will do most inspections by helicopter. Access on the ground to tower sites will usually be required only

44 Appendix B, Presentation to the Solandt Commission, System Maintenance Division Practices and Procedures.

Appendix C, Presentation to the Solandt Commission on the Procedures to be Followed for the Construction of the Lennox G.S. to Oshawa 500 kV Transmission Line.

once a year unless an unexpected emergency arises. Major maintenance on towers may require access by heavy vehicles once every ten years or so. In uncultivated areas control of the growth of trees and brush will require access every two or three years. Most control of vegetation will be by selective cutting and planting of compatible species but controlled use of selective herbicides will occasionally be needed.

Control During Construction

At the public hearings Ontario Hydro's description of their policies and practices for land acquisition, detailed route and tower site selection, construction, restoration and maintenance was almost universally approved. On the other hand many were sceptical of Ontario Hydro's ability to carry out their good intentions. Even where the work is being done by Ontario Hydro's own forces under close supervision it may not always be possible to restrain the enthusiastic operator of a bulldozer or a heavy crane. Where work is being done by a contractor, detailed hour-to-hour control is even more difficult. Many landowners suggested the need for a mechanism through which the landowner can very quickly stop actions that are contrary to Ontario Hydro's policies and to their undertakings to the individual landowner. Ontario Hydro did not deny the possibility of mistakes and miscalculations and it is clear that both Ontario Hydro and the landowners would be happy to see a suitable control mechanism established. This view is strongly supported by the Commission.

The Commission recommends that Ontario Hydro, in consultation with government agencies and appropriate organizations such as the Ontario Federation of Agriculture and the Sierra Club of Ontario, arrange to set up some organization with appropriate local offices along the route where a landowner can call and get speedy action on complaints and difficulties. Such a mechanism could range all the way from an office staffed by the Property Division of Ontario Hydro through offices staffed by any one of several ministries to a completely independent ombudsman. As a result of impressions formed at the public hearings I am confident that Ontario Hydro's Property Division would do the job excellently. However, I know

this view is not shared by all the landowners in the area, some of whom are very suspicious of Ontario Hydro and take delight in quoting "horror stories" from the past. Whatever mechanism is established must appear credible to the great majority of landowners.

Ontario Hydro now has a series of publications available through the central and regional offices, which explain policies and practices relating to land acquisition, construction, right-of-way restoration and maintenance. Among the chief ones are: Field Practices, Acquiring Land for High Voltage Transmission Lines and Maintaining Hydro Rights-of-Way. On their first call on each of the landowners affected by the final route of the transmission line, Ontario Hydro staff should leave copies of the appropriate publications.

Residences and Rights-of-Way

If Ontario continues its existing growth in both population and economic activity there will undoubtedly be continuing need to construct new 500 kV transmission lines. There will understandably and rightly be public pressure to accommodate new lines by widening existing rights-of-way rather than by finding completely new routes. Where the probability of needing to expand a right-of-way in the foreseeable future is high it would seem to be prudent to permit Ontario Hydro either to acquire or to reserve the additional width on the right-of-way. In the present case if the Commission route is adopted the only additional right-of-way required for the connections in Stage II is an additional 175 foot width for 14½ miles from the Wesleyville Generating Station to the Darlington Generating Station. I recommend that Ontario Hydro be given permission to acquire or to reserve this additional right-of-way now, even though the time at which this line will be built is still uncertain. The probability of using this right-of-way is high enough that Ontario Hydro should be permitted to offer the landowners the alternative of selling their land or granting an easement now or of accepting Ontario Hydro's proposal of obtaining a covenant from the landowner by which he would agree not to build on the land.

In a submission to the Commission, Ontario Hydro suggested a plan for getting a covenant from adjacent landowners. The proposal was that landowners should be given a one-time payment of 5% of the value of the land in return for an agreement not to build on land that Ontario Hydro might require and also to attach this restriction to any deed of sale should he or she dispose of the land. Details of the actual covenant would need to be examined carefully especially whether the covenant should be permanent or for a term of years and whether it should be paid for by a one-time payment or by an annual payment to be continued as long as the reservation is in effect.

The studies made of the Gatineau route both by Ontario Hydro and by Tom Sparling suggest that there has been selective construction of homes along the edge of the transmission line right-of-way. The Commission has received the same impression in the study of other existing rights-of-way. In

the case of the Gatineau right-of-way it is quite possible that building of homes along the edge of the right-of-way was encouraged by the many diagonal severances created by this route since it cuts across the pattern of the survey throughout its whole length. It is obviously of the greatest importance to the long range planning of transmission line rights-of-way to determine whether this phenomenon really exists and if so what are its causes. The Ministry of Treasury, Economics and Intergovernmental Affairs is probably the appropriate agency to initiate such a study.

Removal of Houses

During the OH/CAI study the members of the public who replied to the questionnaires were mainly from within the agricultural community. They considered that it was almost as important to avoid removing homes, whether urban, suburban or rural, as to avoid crossing cropland. In testimony to the Commission a great many people stated that they would give highest priority to avoiding occupied homes and farm buildings currently in use. In choosing their recommended route both Ontario Hydro and CAI demonstrated a major concern for avoiding the need to remove occupied homes. In spite of this no jogs appear to have been put in the line in order to avoid a specific house. There is equally no doubt that if the route had been selected without any regard for houses it would be straighter than it is. The costs of deviations from a straight line are very substantial since they require the provision of heavier and stronger towers at the bends. Representative cost figures are given in Table IV. For example, if four medium anchor towers were required to divert a single line of towers around a house and back to its original line, the added cost would be about \$300,000. Obviously, such heavy expenditures which add nothing to the quality or capacity of the line should be avoided wherever possible.

Efforts to avoid homes can be seriously overdone. The people who testified before the Commission had homes they considered satisfactory and would be very unhappy if they were forced to move. Unfortunately, not every family is so well situated. Some have a sub-standard house which they might be pleased to have replaced with a more modern one. I believe that in each case where a route has been selected which involves added

expense in order to avoid demolishing a home or farm building Ontario Hydro should have a full and frank discussion with the owners of the buildings concerning the trade-off involved. For example, should a situation be encountered where two or more angle towers at \$75,000 apiece are involved in order to avoid removing a home, it would be quite reasonable for Ontario Hydro to enquire whether the owner of the home is really intent on preserving that home or whether he would be willing to have the home moved to a new location or to have a new home of comparable size and quality built for him in another location either on the same property or elsewhere. It seems to me to be quite unwise to assume that every householder is completely satisfied with the status quo.

Right-of-Way Sharing

Throughout the hearings many written submissions advocated right-of-way sharing and every speaker who mentioned the idea gave it strong support. Unfortunately, in each specific case, the alleged advantages of right-of-way sharing disappeared on closer inspection. The apparent advantages of right-of-way sharing include the possibility of reducing the total acreage of right-of-way required because of joint use and avoiding some further land severances because when a right-of-way is widened new severances will be needed only on one side rather than on both sides as would be the case with a new right-of-way. In each specific instance discussed at the Commission hearings these advantages did not appear for one reason or another.

On the Gatineau right-of-way so many homes have been built close to the edge of the right-of-way that far more homes would be removed by widening the right-of-way than by selecting a completely new but adjacent right-of-way. In the several cases where efforts were made to follow a pipeline difficulties arose for several reasons. Bends can be cheaply and easily installed in a pipeline so there is no great economic pressure to keep it straight. The cost of jogs in a transmission line is great and so it is frequently impossible or uneconomic for a transmission line to follow exactly an existing pipeline right-of-way. Since pipelines interfere relatively little with agriculture they are often laid diagonally

across the pattern of survey. A transmission line right-of-way following the pipeline creates more important diagonal severances and it becomes increasingly difficult to locate towers on lot lines to reduce their effect on agriculture.

Low voltage transmission lines are often located along a road allowance with a considerable saving in land use but with a 500 kV line the clearances required are so great that there is little or no gain. In rolling country railways, especially the older ones, are so crooked that it is impossible to follow them closely enough to realize the benefits of right-of-way sharing - and so it goes.

While the hearings have made it obvious that it is rarely possible to have a new transmission line share effectively in the right-of-way of another pre-existing linear land use it seems likely that the reverse is not true. When a right-of-way for a 500 kV transmission line has been obtained and the line built it should be possible to put other linear land uses such as pipelines and rapid transit in the transmission line right-of-way.

This pessimism about the importance of right-of-way sharing does not extend to utility corridors. The concept of a utility corridor is to group together a variety of linear land uses in such a way as to minimize their total impact on the regional environment and their effect on other land use in the area. Ideally, such a utility corridor should be pre-planned and should precede all other development. This has not yet been achieved in Ontario but, nonetheless, some effective functional utility corridors have arisen spontaneously as in the case of the one between the Wesleyville and Darlington Generating Station sites.

The Hearing Mechanism: Present and Future

During recent years the public has begun to insist, sometimes stridently, on "participating" in decisions that directly affect their own interests. This is often referred to as participatory democracy and is seen as an expansion and refinement of the democratic process. As a result of my experience during two series of hearings I feel that this view is suspect. The public hearing mechanism may be evolving into an institutional structure by means of which a minority can short-circuit the established mechanisms of democracy and achieve its own ends without the opposition ever being mobilized or heard.

The selection of a route for a bulk power transmission line is basically a major land use planning project. In our present system of democratic government, the provincial government has responsibility for land use planning. With the advent of regional government, a new structure of land use planning is beginning to evolve. It would appear that the intention of the provincial government is to depute much of the detailed responsibility to regional and lower levels of municipal government but to retain control of broad strategic planning and of ensuring that regional or local plans do not violate the basic guidelines laid down at the provincial level. Assuming that land use planning will soon be institutionalized along these lines, it follows that when the need arises for planning a major linear land use such as a transmission line which inevitably traverses many municipalities, contact with the public must begin at the lowest level of municipal government. Each level of government must lay the problem before its citizens, probably with the help of Ontario Hydro, and obtain their views on the subject. A positive effort should be made to obtain representative views from the whole community rather than just views from a self-selected group most of whom are adversely affected by the proposed development. These views must then be put together at successively higher levels of government and difficulties discussed and overcome until finally an acceptable plan appears at the provincial level. Obviously such a process cannot be carried on in the tidy succession of stages that I have described. There will inevitably

be participation of one level in the work of another and repeated feedback and discussion between the levels during the process of evolving an acceptable plan.

In the case of the Solandt Commission which was appointed by the Province to hear the views of the public on proposals for a route that cuts across many municipal jurisdictions, the possibility of these governments being by-passed is obvious since the Commission deals directly with the public and reports directly to Cabinet through a senior minister. To minimize this effect the Commission has made a determined effort to get an input from all the levels of government involved and to include not only elected representatives and administrative officials but also planners. Most of the municipalities responded but their replies, with a few important exceptions, have generally, for a variety of reasons, not been helpful in selecting a route. In a small municipality where only one proposed route crosses the municipality, the reaction has almost always been to say "put the line in some other municipality". In most cases the municipality has been unwilling to suggest an alternative route because of the need to maintain a good relationship with its neighbours. In larger municipalities where two alternative routes which crossed different parts of the municipality were under discussion the municipal authorities have usually remained firmly on the fence. They felt no responsibility for the decision and whichever choice they made would offend a substantial number of their voters. Consequently, the sensible course of action was to avoid supporting either route.

Thus the mechanism of the Commission inquiry tends automatically to relieve the lower levels of government of a feeling of responsibility for the planning decisions and so in effect to short-circuit them. This would be relatively unimportant if the Commission of Inquiry did in fact provide an alternative democratic means for reaching a decision. Unfortunately, the Commission mechanism is not necessarily democratic. There is no question that every citizen in the affected area and even in the entire province has a perfect right to appear and give his views to the Commission. Unfortunately, only a narrow cross-section of those poten-

tially concerned appeared before the Commission. They could be broadly divided into two groups. The first consisted of local residents of the area who felt that their own personal interests would be adversely affected by one or other of the selected routes. They came forward to oppose a suggested route and in some cases to suggest an alternative that would involve their interests less closely. They were in general not concerned with the broad principles of finding the best possible route or as some would say the "least worst" route. The second, broadly classified as environmentalists, were people concerned with trying to minimize the impact on the natural environment of any of the major works of man. Their input is essential and would be made almost regardless of the location of the particular route being considered. The great majority of people in the study area and those living outside the study area who would be affected by the planning decisions failed to speak or even to appear at the Commission hearings. For example, virtually no one but the Ministry of Transportation and Communications presented a submission on behalf of the travellers on Highway 401 or other major through highways in the area and, in order to get a reasonable picture of public attitude toward the Ganaraska Forest, the Commission had to plan a special seminar and invite suitable people to come to present their views.

I feel that the Solandt Commission has served a useful purpose during a period in the evolution of regional government and of mechanisms for land use planning when no other suitable mechanisms were available. However, I would now recommend substantial changes in the pattern of future public hearings to ensure that they help and do not hinder the evolution of a truly participatory democracy.

I am convinced that it is important to have effective public participation in the land use planning process and that the relatively informal public hearing is a good way of achieving this, provided ways can be found for ensuring that municipal governments are adequately involved and that those who appear at the Commission hearings are:

- (i) representative of the public at large, and
- (ii) can give enough time to the hearings to ensure the continuity so essential to the self-education required for effective participation.

A possible way of achieving this representation and continuity and of keeping the municipal governments involved would be to ask each appropriate unit of municipal government to appoint a small number of citizens representing differing points of view to attend all the hearings of the Commission on behalf of the municipality. In effect these representatives from the involved municipalities would constitute a standing committee that would attend all hearings of the Commission that affected their area. They would hear all submissions and have priority in cross-examining witnesses. The general public would of course be encouraged to attend but would be under no obligation to attend regularly. In order to spread the burden of attendance within the municipality the hearings might be made up of several committees, each dealing with a separate aspect of the subject.

This plan probably does not represent the ultimate in organization for public participation but it would represent a major step forward. It would ensure the continuing involvement of municipal governments in the work of the Commission and a much more widely representative audience of citizens which would include not merely those who were adversely affected by a proposed route but others who might even oppose their views. Most important, it would ensure enough continuity of attendance to facilitate the mutual education that is really the key to success in public participation.

In the course of writing my report on the Lennox to Oshawa hearings I have become more aware of the advantages of a Commission or other hearing-body responsible for advising the government to become involved in a public study of future transmission lines at each major stage during the progress of the study rather than leaving the Commission hearings until the study has been completed. For instance, it should be possible to appoint a Commission of Inquiry at the time of the first proposal for a new transmission line route. The Commission would then hear evidence concerning the necessity for the line and the constraints that had to be accepted in selecting the route including evidence concerning the selection of generating station sites and definition of load centres. This

would not mean that the Commission would necessarily hear public evidence on the selection of the generating station site though this might be the easiest way to deal with that problem. All the Commission dealing with the transmission route would require would be evidence that the site selection had been studied and approved by appropriate authorities. The Commission would then hear evidence on the size of the study area to be considered and on techniques and procedures to be used in the study. In this way the Commission could make sure that all possibilities were adequately considered as the study proceeded.

Being wise after the event I feel that the present report could have been produced more quickly with far less time and expense for studies and hearings and with more confidence had the Commission undertaken a series of initial hearings of this kind rather than waiting for the final OH/CAI report. Attention would have been focussed much earlier on the most difficult questions and the data needed to formulate answers would have been collected, analysed and presented in a more coherent way.

In retrospect, it seems too that the value of the hearings on the Lennox to Oshawa route was reduced because no one appeared to give consistent support for the recommended route. CAI only appeared at the initial hearings and although Ontario Hydro appeared at all the hearings and did a first class job of explaining every conceivable route, they made no effort to "sell" any specific route. While representatives of Ontario Hydro quite naturally supported the route recommended as a result of their joint study with CAI they repeatedly said they were quite willing to build the lines along whatever route was finally decided upon and so expressed no strong preference. On the other hand the audience at each hearing was composed almost entirely of people who opposed whatever specific route was under discussion. Since Ontario Hydro was not prepared to take an opposite view and since it seemed inappropriate for the Commissioner to do so the hearings did not take the form of pro and

con discussions but were devoted entirely to evidence against whichever route was being discussed. As a result neither Ontario Hydro nor other witnesses were effectively questioned at the hearings. The Commission attempted to make good this deficiency by asking Ontario Hydro for a series of supplementary presentations which were always quickly and cheerfully prepared. Unfortunately, these in turn did not always bring out the desired discussion. It would have been easy for the Commissioner to ask many of the necessary questions but this is difficult to do without raising the question of pre-conceived biases. Obviously the best solution is in future to have any proposed route for a transmission line actively supported and defended by those who choose it.

Making Contact With the Public

Although the Lennox to Oshawa route has been under public discussion for more than three years people appeared at almost every hearing to complain, often bitterly, that they had never been notified of the possibility of the construction of the transmission line. Several quite lengthy public discussions were held concerning the ideal means of notifying the public about plans for the route of a new transmission line. Since this is a problem that will arise continually in connection with future public hearings on any major land use it seems worthwhile to summarize the Commission's experience.

In the case of the route between Lennox and Oshawa contact with the public was first made by Ontario Hydro in March 1972. From then until the end of the hearings in January 1975 Ontario Hydro, CAI and the Solandt Commission were successively in contact with the public by many different means. It is not worthwhile reviewing each individual effort, but it is important to make some comment on the Commission's experience with different methods of public communication.

Prior to the start of the Commission hearings in the spring of 1974 advertisements were put in the daily and weekly newspapers of the study area and in the major Toronto daily papers. In addition, there were many radio announcements. The local press particularly did a splendid job in

alerting people to and in publishing news reports on the hearings. The Commission established an initial mailing list of all potentially interested groups and associations including municipal governments, planning agencies and conservation authorities in the area and to this added the name of any individual who made a submission to the Commission, appeared at a hearing or asked for information. In this way the Commission quite rapidly built up a mailing list of all those in the area who had expressed an active interest in the proceedings of the Commission. This list was used for all further mailings and grew throughout the hearings.

In spite of all this publicity, citizens continued to appear at the hearings complaining that they had not known that planning for the transmission line was going on. Most of them maintained that a registered letter should have been addressed to them personally. Ontario Hydro did undertake a mass mailing to every householder in the study area showing their preferred and alternative routes on an information map and giving details of the forthcoming Solandt Commission hearings. This was done in early April 1974, at the time Ontario Hydro submitted their report to the Commission. The mass mailing list used was taken from the provincial assessment roll which is on a computer in Ottawa. This mailing was relatively unsuccessful because the assessment roll was not complete or up to date. The use of provincial assessment rolls also results in many of the notices being sent to absentee landlords who may not communicate the information to tenants.

As a result of the discussions before the hearings it was concluded that if mass mailing were desired in the future it would be best to use local municipal assessment rolls as the basis for the mailing. Even if a reliable mailing list can be obtained in this way the Commissioner doubts if a mass mailing is worth the cost involved. In an area as large as this study area with a population of 73,000 the cost for a single mailing would be more than \$50,000. The alternative of doing a selective mailing along corridors where it is considered likely that the route will go is obviously not acceptable since this pre-judges the result of the hearings.

My conclusion is that a mass mailing to every householder in the study area is only justified in places where the study area is quite small. In larger areas formal notices in the newspapers with announcements on radio and television plus mailings to a selected list will have to suffice. In cases such as the Ontario Hydro long range plan, where most of the province is involved, the responsibility for initial publicity should certainly be deputed to the municipalities. Each municipal government should be given the responsibility of informing its own citizens of forthcoming hearings. This will serve the double purpose of notifying the citizens and of identifying the municipal government with the issue.

Time and Cost of Public Hearings

It would be very difficult to make a convincing cost benefit analysis of any series of hearings. Probably because of this difficulty and because the cost is high little attention has been given to considering whether any particular set of public hearings is worth what they have cost. The Solandt Commission has been run very frugally. It is now easy to see in retrospect that a larger staff could have produced the report a month or two earlier. However, even at this modest level the direct expenses of the Commission have been \$110,000. These direct expenses do not include office rent, supplies, etc. nor do they make any allowance for the cost of the original OH/CAI study or of the cost incurred by Ontario Hydro, provincial ministries, municipal governments, organizations and the public in preparing submissions and appearing before the Commission. These expenses must have exceeded the direct cost of the Commission by an order of magnitude.

In addition to this expenditure the public hearing process imposes a delay of one or two years in Ontario Hydro's planning and construction cycle. This delay undoubtedly adds further to the total cost and to the uncertainty of the planning process. In emphasizing these costs and delays I am not suggesting that public hearings should not be held but rather that they should be held only after the most careful consideration and planning. Before a public hearing is undertaken there

should be a very clear definition of the questions that are to be discussed, of the sector of the public that should be involved, of the cost and time required to prepare material for the hearings and of the likely duration of the hearings. Careful preparation of this kind will narrow the issues to be discussed, simplify the presentation, facilitate communication and speed up the entire process.

Trying to Foresee the Future

In the course of the hearings I have frequently said that, as Commissioner, my aim is to select a route for the Lennox to Oshawa transmission line which will appear, even to those adversely affected by it, as a reasonable and carefully thought out choice based on the best data available today and which will still look quite sensible 10 or even 20 years from now. In making the choice I have given greatest weight to the relatively short term where the factors involved can be predicted with greater accuracy. But longer term considerations should not and have not been ignored.

In this section, I have tried to limit myself to those aspects of the future that appear to have a direct impact on the questions considered by the Commission. It is obvious that many of these questions will also be considered in much greater detail in the public hearings on the Ontario Hydro long range plan. My comments should be regarded as an effort to relate the recommendations of this Commission to the long range plan rather than to pre-judge any of the issues that will arise at those hearings.

Land Use

All over Ontario and especially in the south where the pressures of urban development are greatest and the climate and land are most suitable for agriculture, a sense of urgency about the need for effective land use planning and control is growing. This sense of urgency is well exemplified by the Ontario Federation of Agriculture's recent plea⁴⁵ for a land use policy that would be based on inventory and allocation with a firm and virtually irrevocable designation of selected land for agricultural use. Unfortunately, in the area that has been considered for the Lennox to Oshawa right-of-way, including not only the OH/CAI study area of 1,400 square miles but also an extended area to the north

45 Ontario Federation of Agriculture, Agricultural Land-Use Policy, January, 1975.

of Rice Lake, land use plans were of little assistance in giving either short term guidance or the very important longer term picture of future land use in the area which should also be considered in route selection.

From the viewpoint of the planning agencies the hearings took place at a most unfortunate time. Especially in the newly constituted regional municipalities, new plans are in an early stage of formulation and the old plans are more or less in abeyance. The Commission made a serious effort to obtain all relevant planning information from the responsible provincial and municipal agencies but found that little was available. Without the intervention of new plans and land use controls it is virtually certain that population densities in the area will continue to grow, with the towns and villages to the west growing substantially faster than those to the east and with the fairly rapid growth of population scattered through the scenic high ground lying some miles back from Lake Ontario.

If the present pattern of growth is permitted to continue land will continue to go out of agricultural use at an alarming rate. This is a matter of very great immediate concern not only to the farmers and to the economy of the area but also to the whole of Ontario, of Canada and even of the world. The total amount of Class 1 and 2 agricultural land in Canada in a climate favourable to the growth of a wide range of crops is very small. Much of the agricultural land in the study area is in this category and is therefore to be regarded as a scarce, valuable and irreplaceable resource that must be protected even at great cost. Obviously, this cost must not be borne entirely by the owners of the land. Irrevocable agricultural zoning is by no means enough to ensure the economic success of a farm, especially in an area that is under suburban developmental pressure. This is not the place to expand on this theme. It is sufficient to say that the Commission feels that the primary goal of land use planning and control in this region should be to preserve Class 1 and 2 agricultural land for agricultural use and to ensure that the other relevant factors combine to make farming economically attractive. In the meantime the transmission route is a very minor element

in this problem since, when construction is complete on the selected route, the total reduction in actively cultivated crop land will be much less than 100 acres.

It is surprising that there has been so little development of the lake-shore in the study area. This situation will probably continue except in areas where there are harbours to accommodate marinas, because Lake Ontario is too large and rough for enjoyable small boat operation except out of a sheltered harbour and is generally too cold for pleasant swimming or water skiing.

Areas such as the Ganaraska and several skiing areas that are dedicated to public recreation will unquestionably become more and more heavily used and popular because they are easily accessible to city dwellers.

Load Growth

Ontario Hydro has based its predictions of future load growth on the assumption that it will continue at an average of 7% per year as it has for the past 50 years, resulting in a doubling of load every 10 years. Man's recent visualization of Planet Earth as an isolated and finite sphere in space, combined with the population explosion and rising fuel prices, has induced many to advocate a conserver society in which per capita consumption of all potentially scarce resources including energy will ultimately be greatly reduced. Undoubtedly these forces will prevail and the rate of growth of energy consumption in the developed nations including Canada will soon begin to decline. However, this reduction in the rate of growth of total demand for energy will not necessarily result in a reduction of the demand for electricity in Ontario Hydro's service area. In fact it seems more likely that the rate of growth may temporarily increase. This is not the place for a long dissertation on the subject but, very briefly, the main factors involved are that the prices of fossil fuels (coal, oil and gas) are high and while they may decline in the short run the long term tendency will be steadily upward: the combustion of these fuels adds to atmospheric

pollution and is therefore unpopular; the cost of nuclear fuel will probably not rise nearly as rapidly as the cost of fossil fuel and its use does not add to atmospheric pollution; there will, therefore, be increasing pressure to use electricity from nuclear generating stations for heating and wherever possible as a substitute for the consumption of oil or gas in small internal combustion engines. Thus even if per capita energy consumption in Ontario rises less rapidly in the future than it has in the past, per capita consumption of electricity is likely to rise as quickly or more quickly than in the past.

New Power Sources

In popular discussions of the use of tidal, solar or geo-thermal sources of energy, many people are misled into the belief that these will quickly eliminate the need for Ontario Hydro to build further thermal plants, whether nuclear or fossil-fueled. Similarly, it is often said that the nuclear fission plants, such as the CANDU reactors at Pickering, will rapidly be replaced by fusion reactors. Anyone who is familiar with the political, social and engineering problems of getting a new source of central station power into use will know with complete certainty that none of these alternatives will be available in operating form ready to connect to Ontario Hydro's power network within 20 years and most of them will be 30, 40 or 50 years in the future. Virtually the only major improvements in central generating station technology that are sufficiently advanced to have any effect during the next 20 years are the potential improvements in the CANDU reactor brought about by adding thorium to the core and by enrichment with plutonium. With these improvements the efficient use of uranium by the CANDU reactor, which is already much better than any other nuclear reactor in commercial use today, can be further improved. This again means that the cost of electricity from nuclear power stations is likely to rise somewhat less rapidly than power from other sources and consequently will further encourage the use of electricity.

Future Improvements in Bulk Power Transmission

Many people also expect that major improvements in bulk power transmission will be available for practical use within the next few years. The evidence that was presented to the Commission does not support this view. Underground power transmission by AC cables will undoubtedly undergo steady improvement and these cables will be installed at an increasing rate in cities for both economic and aesthetic reasons, but major long distance rural transmission lines will not be put underground in the next ten to twenty years. The following quotation from a previous report of this Commission briefly reviews other possibilities:

Among those that were described in more or less detail to the Commission were substantial improvements in existing cable technology including plastic sheaths, better insulation and a variety of internal and external cooling systems. Next came the so-called spacer gas system including, particularly, SF₆ (sulphur-hexafluoride) and DAMUT (ducted air medium underground transmission). Sulphur-hexafluoride is a very stable gas with highly desirable electrical properties which is already being used as insulation in high voltage switch gear and bus connections within the transformer and switching stations. Its use promises to reduce the size of these stations many fold. The development of this equipment is largely in the hands of manufacturers, mainly in Europe. Ontario Hydro participates actively by buying the latest "state of the art" equipment. The DAMUT system is an attempt by Ontario Hydro to use the same principles, but with air rather than sulphur-hexafluoride as the insulating agent. The project is, at present, very promising but development is so far limited to 230 kV and it could be some years before even this is fully tested.

Direct current transmission is on the verge of major developments. It has long been known that direct current lines, whether overhead or underground, were smaller and cheaper than alternating current lines of similar capacity, but it is not easy to change voltages in DC systems and so equipment is needed to convert from AC at the generators to DC for the transmission lines and back to AC for local use. Until recently the rectification equipment was expensive and complicated. Recent developments in solid state physics are already beginning to result in much cheaper and more reliable equipment for interconnecting

AC and DC lines. Here again the slow process of evolution is proceeding, with Canadian utilities and industry playing a leading role while Ontario Hydro watches closely.

Another area of great promise is in the use of cooled cables. When cooled to the temperature of liquid nitrogen, underground cables have very low resistance and, consequently, very high carrying capacities. With still further cooling, certain alloys lose all electrical resistance. This property is the basis of the so-called superconducting cryogenic cables. All of these and other possibilities are promising. All are being developed by one or more industries or utilities but their penetration into the operating systems of the utilities will undoubtedly be slow.

In addition, there are many individuals who question the advisability of continuing to distribute energy in the form of electricity to individual homes and factories. There are strong arguments for having large central nuclear power plants producing either hydrogen or some simple hydro-carbon which would then be distributed by underground pipeline to individual load centres such as homes or factories. In the ideal system, each home or factory would have its own fuel cell which would produce heat and electricity locally. The efficiency of the fuel cell is so high that waste heat could safely be discarded into the air locally. The other waste products would be water and carbon dioxide. Obviously these possibilities must be examined carefully because if among them is the route of choice for our energy rich society, then we should divert effort into it rather than pursue the further refinement of electrical distribution systems.⁴⁶

⁴⁶ Report of the Solandt Commission "Closing the Generation Gap", A Public Inquiry into the Transmission of Power between Nanticoke and Pickering, March 1974, pages 84 - 85.

Finale

This report records another faltering step forward toward the improved quality of life for which we all strive. The difficulties that are portrayed in it underline the need for improvement in two broad areas of social organization: land use planning and control and the use of science and technology to help in the achievement of social and economic goals. The need for improved land use planning and control has been repeatedly emphasized throughout the report. The need for better institutional mechanisms to bring science and technology to bear on problems such as bulk power transmission lines is described in the following paragraph from my previous report:

Although it is outside the immediate terms of reference of the Commission, I would strongly urge that the Federal and Provincial Governments, as part of their program to coordinate action on energy problems, define Canada's goals for new technology needed both for the generation and transmission of power over the next twenty to thirty years and then immediately implement and adequately fund programs to ensure that these goals are achieved. It is not necessary to do all the research work in any one province or even in Canada. What is necessary is to ensure that all the major developments required are in hand somewhere and are being adequately funded and coordinated. Canada already has substantial resources on which to build in Ontario Hydro, Hydro-Quebec, the National Research Council and industry. With proper planning we can more than pull our weight in international efforts to devise better energy supply and distribution systems.⁴⁷

47 "Closing the Generation Gap", p. 87 - 88.

Appendix A

Ontario Hydro: Property Policies and Practices

Revisions to Ontario Hydro Property Acquisition Policies - Summary

The Board of Directors of Ontario Hydro has approved new and more flexible policies for the acquisition of transmission line rights of way. The Board wishes to ensure that acquisition procedures and compensation formulae are more than fair to the people whose properties are affected by Hydro transmission lines.

The new policy, worked out in close co-operation with farm organizations and in consultation with several government Ministries and outside agencies includes the following departures from previous practices.

In response to requests from the farm community, through both the Ontario Federation of Agriculture and the National Farmers Union, for full protection for farmers under The Expropriations Act, Ontario Hydro will apply expropriation procedures to all owners. Although these procedures do not prevent negotiated settlements for compensation, they will ensure that owners will have full access to all of the protections of the Act, especially the Hearing of Inquiry, the Board of Negotiations, the Land Compensation Board and many other rights guaranteed by the Act.

Owners will be given the choice of either transferring ownership of the land required to Hydro, or granting a perpetual easement.

Hydro will pay for the easement either in a lump sum or by an annual adjustable payment. The owner can choose the option he prefers.

Where Hydro purchases land, the existing practice of licensing it back to the former owner for agriculture, at a nominal fee of one dollar per acre per year plus taxes will be continued. This procedure has been responsible for maintaining many hundreds of acres of rights of way for the production of food.

As provided in the Act, compensation for purchase of land is based on market value, to which may be added allowances for injurious affection, disturbance, etc. and reasonable expenses. Hydro is also prepared to recognize the special impact which a transmission line imposes on the farm operation by making an additional allowance for this disturbance related to market value of the required land.

Compensation for an easement will be based on 75% of the market value of the land to cover the basic right of way. To this will be added an additional payment for any tower structures which will be required; the compensation for the first structure will be based on 75% of the value of one acre of land. This compensation will be increased by 5% for each succeeding structure. For example, compensation for the

second structure will be 80% of the value of one acre of land, 85% for the third structure and so on. The minimum payment per structure will be \$100.00.

Should an owner choose to receive an annual payment for the easement instead of a lump sum, the amount will be determined by applying the chartered bank prime interest rate plus one-half per cent to the lump sum payment determined as described. For example, if the current chartered bank prime rate is 11%, then the current annual payment will be $11\frac{1}{2}\%$ of the lump sum value of the easement.

The annual payment will be reviewed periodically as follows. The interest rate to be used will be established on January 1st of each year after the initial payment. The value of the easement, as it relates to market value of the land, will be reviewed every 5 years. In this way, the annual payment will continue to be related to current land values and interest rates and thus the owner will be protected from any future inflation.

More flexibility has also been incorporated into procedures involving multi-line rights of way where it is proposed to build one line immediately and others in the more distant future. Hydro is prepared to acquire rights for the entire width at the outset or to obtain only those rights required immediately. In this latter case, the remainder would be acquired at market values prevailing at that future date. If the owner is willing to grant a restrictive covenant agreeing not to build on the future right of way, Hydro will pay him 5% of the current market value of the land it will require in the future.

These are, in brief, the changes Hydro intends to incorporate immediately in acquiring property for its transmission line rights of way. The policy is set out in more detail in our written submission to the Solandt Commission, dated May 22, 1974, which is attached.

N.J. McMurtrie
Director of Property
May 22nd, 1974

Ontario Hydro: Property Policies and Practices

General

In acquiring property, Ontario Hydro is in the same situation as any other public body which may be granted the right of expropriation. In this regard, Ontario Hydro must of course follow established public policy as provided in legislation and as administered in the courts.

With the passing of recent legislation, especially The Expropriations Act 1968-69, the entitlements of owners have been clearly set forth. Compensation is based on the premise that no owner should be put in a position of financial loss as a result of the taking by any expropriating authority. The Act stipulates that compensation must be based on market value plus, where applicable, such additional considerations as injurious affection, disturbance, and the like. The Act also recognizes other costs such as legal, survey, moving expenses, etc.

The determination of market value, together with such things as injurious affection, is made by a professional appraiser. Ontario Hydro employs appraisers on its own staff but also uses independent appraisal firms for this service. On any particular project, Hydro will likely use both its own staff and outside appraisers; a comparison of results provides a substantiation and audit of appraisal performance. The ultimate test of any appraisal occurs when it is presented in evidence before the Land Compensation Board. For this reason, appraisers closely follow the precedents set by this Board as well as their own professional standards.

After the appraisals have been made, a separate staff of Hydro property agents then attempts to arrive at settlements with the owners, using the appraisals as financial targets. In negotiating settlements, Hydro tries to ensure that its offers to the owners are fully in accord with their entitlements under the Act and are clearly seen to be so. This is intended to encourage negotiated settlements and to avoid the additional delays and expense, to both the owners and Hydro, of arbitration by the Land Compensation Board.

Land Rights Required by Hydro

In acquiring property rights for transmission lines, Ontario Hydro is prepared either to take an easement or to purchase (full ownership) of the land involved, whichever the owner chooses. There may be a few situations, such as in the immediate vicinity of stations, where engineering features require that Hydro purchases the land. But these will be a small minority.

(1) Easement

An easement is a limited interest in the land and implies only a partial interference with the owner's rights to the land. The owner is not permitted to erect buildings on the easement.

When an easement is granted to Hydro, the title to the property remains in the owner's name but becomes subject to the easement. The owner continues to be responsible for the property taxes. Although easements can take various forms, most of those obtained by Hydro are for limited rights such as using a portion of the property to build a power line. The easement also includes the right for Hydro to enter the property from time to time to inspect and do maintenance or repair and re-construction work on its facilities. Hydro will fully compensate an owner for any damage caused when doing such work.

In other words, by an easement Hydro buys certain rights and assumes certain responsibilities. The property owner sells certain rights and retains certain privileges.

(2) Purchase of the Land

When Hydro purchases the land, it assumes full ownership including responsibility for taxes and other aspects of land ownership. In virtually all cases of transmission rights of way the former owner can obtain a license from Hydro to continue to use the land after the lines have been built.

Compensation

(1) Purchase

The basis of compensation used by provincial government agencies in Ontario is spelled out in The Expropriations Act. Compensation is based on the market value of the property; this is defined as the amount that the land might be expected to realize if sold on the open market by a willing seller to a willing buyer. This value is usually determined from an examination of recent sales of similar properties in the same general area, with allowances made for time of sale, as well as factors such as location, improvements, zoning and soil quality.

Since Hydro usually buys only a part of a property, a determination is made of the effect which this has on the remainder of the property which the owner continues to hold. If there is found to be a reduction in the value of the remainder, due to change in size and shape, effect on buildings, etc., then this is added to the market value of the purchased portion in making up the total offer for compensation. The Act also makes provision for payment of other allowances such as disturbance, legal and survey costs, etc. as applicable. In addition, Hydro is also prepared to recognize the special impact which a transmission line imposes on a farm operation by making an allowance for this disturbance related to market value of the required land.

Sometimes both owner and Hydro agree that it is appropriate for Hydro to buy an entire property. This could apply, for example, where an owner's residence or main buildings are involved. It may also be appropriate in cases where most of the property is required by Hydro

and the remainder is too small to permit the owner to continue effectively in his normal operations, even with a license to use the right of way. (In such cases, Hydro would offer the surplus property to the local municipal utility, to the municipality, Ontario Government Agencies, or sell it on the open market.)

If it is necessary to buy an entire property, requiring an owner to move his residence, allowances will be included in the offer to cover reasonable moving and relocation costs.

(2) Easement

Ontario Hydro has developed a compensation formula for use in agricultural lands, which is based on market value and which recognizes the value of the land affected plus the impact which the transmission line has on the farming operation. Under the formula, compensation for an easement will be based on 75% of the market value of the land to cover the basic right of way. To this will be added an additional payment for any tower structures which will be required; the compensation for the first structure will be based on 75% of the market value of one acre of land. This compensation will be increased by 5% for each succeeding structure. For example, compensation for the second structure will be 80% of the value of one acre of land, 85% for the third structure and so on. The minimum payment per structure will be \$100.00.

An owner can choose to receive an annual payment for the easement instead of a lump sum; the annual amount will be determined by applying the chartered bank prime interest rate plus one-half per cent to the lump sum payment determined as just described. For example, the current chartered bank prime rate is 11%; therefore the current annual payment will be 11½% of the lump sum value of the easement.

The annual payment will be re-assessed periodically as follows. The interest rate to be used will be established on January 1st of each year after the initial payment. The value of the easement, as it relates to market value of the land, will be reviewed every 5 years. In this way, the annual payment will continue to be related to current land values and interest rates and thus the owner will obtain the benefit of any future inflation.

(3) Future Requirements

On multi-line corridors, where Hydro proposes to construct one line now and subsequent lines in the more distant future, Hydro is prepared either to obtain rights for the entire corridor at this time, or to obtain only those rights required now leaving the remainder of the corridor for future acquisition based on market values at that future time. If the owner wishes to grant Hydro a restrictive covenant whereby he agrees not to construct future buildings or other structures on the defined corridor, Hydro is prepared to pay for this covenant 5% of the current market value of the additional lands involved.

Expropriations Act Explained

The Expropriations Act is designed to protect the interests of both the individual owner and the expropriating authority.

Essentially, the Act provides for:

1. A hearing at which the individual property owner may make his views known to the Minister having jurisdiction and to establish whether the taking is fair, sound and reasonably necessary in the achievement of the objectives of the expropriating authority.
2. A Board of Negotiations and a Land Compensation Board at which the individual property owner and expropriating authority may present unresolved differences regarding the price to be paid for the property.

The Minister has the responsibility to either approve or disapprove of the expropriation.

If permission is granted, Hydro will register a plan in the local registry or land titles office which has the effect of expropriating the land. The owner is then entitled to compensation.

It should be noted that during the expropriation process Hydro will continue negotiations in an effort to reach a settlement.

No Agreement on Price

If no agreement as to price can be reached after a property has been expropriated, the owner would be offered by Ontario Hydro an immediate payment of 100% of the market value of his land as determined by Ontario Hydro without prejudicing his right to determination of compensation by either the Board of Negotiations or the Land Compensation Board. In pursuit of final compensation, Hydro or the owner can request the assistance of the Board of Negotiations.

The Board of Negotiation will conduct a hearing, may visit the property, and will make a recommendation of what it considers adequate compensation. Its recommendations are not binding.

If either party does not wish to accept the Board's recommendation, that party may request the Land Compensation Board, also a government tribunal, to determine the amount of compensation. This amount, set by the Board, if not appealed within the prescribed time period, then becomes binding on both parties.

Right of Way Use Policy

If farm lands are purchased for transmission line right of way, Hydro will license back to the former owner for farming, any land within the right of way area, which is not immediately required for construction, at the sum of \$1.00 per acre per year, plus a sum equivalent to the taxes. A license for farming purposes may be arranged for as long as a 10 year period.

Hydro also licenses rights of way to municipalities for general park purposes and some recreational purposes such as tennis courts, golf courses and natural ice rinks, subject to prior approval by the Corporation.

Effect on Municipal Taxes

In matters of taxation, this Corporation is governed by Section 47 of The Power Corporation Act. Under the provisions of this section, Ontario Hydro is exempt from taxation but pays grants in lieu of taxes. To determine the basis on which grants are to be paid, Hydro's properties are assessed by the Ministry of Revenue.

Appendix B

Ontario Hydro: Presentation to Solandt Commission System Maintenance Division Practices and Procedures

Ontario Hydro recognizes the establishment and maintenance of high voltage transmission facilities has an effect on the total environment. Over the past few years, Hydro has changed its clearing and management policies in order to minimize the ecological impact of its transmission line rights-of-way and to blend these facilities more harmoniously into the surrounding landscape.

I intend today to briefly describe, and illustrate with slides, our policies as they relate to development and management of new high voltage rights-of-way.

1. Woodlot Evaluation

Once the route is selected and plans or photograph coverage are available, the Forestry Department will do a timber cruise of all woodlots along the right-of-way. The volume of wood by species and diameter and the local market prices will be given to our Property Division to aid in property negotiations.

In addition, this information will provide us with data used in the selective cutting, utilization of forest products and management of trees left after cutting.

2. Development of the Right-of-Way Selective Cutting, Restoration and Management Plan

Upon approval of the route, the acquisition of property commences. At this time, a detailed survey of the right-of-way is undertaken by Hydro's ecologists, foresters, engineers and construction personnel. Areas where possible environmental damage could occur are noted and site specific studies are then carried out to determine the best ways to avoid, minimize, or rectify these situations. This survey also includes locating of required access roads, appropriate treatment of wooded and open areas, and necessary landscape to be done on completion of building the facilities. This plan will be a detailed specification for the construction and management of the right-of-way.

3. Selective Cutting

After approval of the selective cutting and restoration plan has been received and property acquired, selective cutting shall commence. The phases of selective cutting are as follows:

a. Tower Site Clearing

The minimum amount of trees and shrubs is removed from the area where the tower is to be erected. The size of this area is governed by the type of tower to be used, and the construction technique. Each proposed tower site will be inspected by the selective cutting supervisor and the construction supervisor prior to cutting. Each tower site then, with its varied and different characteristics, will be a custom job, that is, only the minimum area shall be cleared.

b. Access Roads

To enable construction to build the towers, access must be provided. Roads are located by the Forestry and Construction Departments in the field. Special care is taken in route locating to minimize the visual impact, potential erosion, and other environmental impacts. At all stream [sic] crossings, culverts or other appropriate techniques will be used and special care will be taken to prevent any erosion or sedimentation. Culverts on the main right-of-way access road will be permanent; that is, they will be left after the facility is built for our maintenance forces, who utilize off-road equipment. After the construction is completed, roads will be planted with grasses or legumes. Existing roads will be utilized wherever possible. On cultivated lands, no permanent access road will be required for routing maintenance operations.

c. Inter-span Cutting

Between the tower sites, only the vegetation that would interfere with the construction and safe, efficient operation of the line will be removed. Special care will be taken at road crossings or other sensitive areas to disturb the existing vegetation as little as possible. If pruning would result in a mutilated appearance, the trees shall be removed instead of pruned.

No vegetation will be allowed to come within 15 feet of the conductors at maximum sag. Trees within this distance shall be pruned, if possible, to maintain this necessary clearance.

d. Clear-cutting to Extend an Existing Field

If all the following conditions prevail, it will be in order to clear-cut if the proposed landuse is for pasture only and clear-cut and grub, if for cultivated crops.

1. The owner expresses a desire for an extension of the field into the right-of-way.

2. The cutting will be acceptable aesthetically.
3. The location to be cut is not ecologically sensitive.
4. The soil lends itself to the new landuse.

e. Disposal of Timber

Where feasible, all merchantable timber will be marketed. Non-merchantable timber and brush will be either burned, piled, chipped, or scattered on the right-of-way to provide wildlife habitat.

4. Restoration

After construction of the line is completed, Hydro undertakes an intensive rehabilitation of the right-of-way. The various functions included under restoration are as follows:

a. Cover Crops

All tower sites that were clear-cut for tower erection are seeded with compatible grasses and legumes. These cover crops not only retard the unwanted woody growth or noxious weeds from establishing themselves, but also help to prevent erosion of the previously exposed subsoil. Access roads are also seeded for the same reasons. These programs will be managed in such a way as to maintain soil stability to prevent stream sedimentation, erosion, and to provide food and shelter for birds and other forms of wildlife. The species to be sown will be determined by the site, time of seeding, and maintenance practices and be compatible with neighbouring farm practices. Adjacent farm operators will be consulted to ensure that our cover crops in no way interfere with their operations.

b. Tree and Shrub Planting

Where screening or other planting is appropriate and where no residual trees can be left, or where the number left are inadequate, trees shall be planted at suitable locations such as road and water crossings, and pond and spring areas. To help screen structures from an adjacent property owner, trees may be planted where appropriate either on the right-of-way or on the adjacent property owner's land, if this is mutually agreeable. The trees to be planted shall be suitable to the local site conditions and will be similar to the existing vegetation in the vicinity. Trees planted under a conductor should preferably be of species that at maturity will not grow within the specified clearance from the conductor or failing that, be of a slow growing nature. At each structure site previously cleared for construction, compatible

species shall be allowed to regrow or appropriate trees or shrubs planted, except for an area required to be kept clear for line maintenance.

5. Reforestation

In townships with less than 15 percent of the farm area in woodlots, an acreage equivalent to that selectively cut may be reforested. This planting may take place on the adjacent property owner's land, land designated by the Ministry of Natural Resources, land owned by the township, county or local conservation authority, or on land owned by Ontario Hydro suitable for this purpose.

6. Right-of-Way Management

The objective of Hydro's right-of-way vegetation management program is to prevent any vegetation from interfering with the safe, reliable and economic operation of the line, and to comply with pertinent legislation regarding noxious plants, to render the right-of-way suitable for other uses where appropriate, to make it aesthetically acceptable, and to maintain or restore as much as possible the previous ecosystem balance. The right-of-way maintenance program is ongoing in that compatible vegetation will be encouraged to develop over a period of time. Location, growth characteristics and pertinent legislation, determine the compatibility of a plant. The development of compatible vegetation will be encouraged by these maintenance techniques.

- selective cutting practices
- selective brush and weed control practices
- establishment by seeding
- establishment by transplanting

Incompatible vegetation must be controlled. This is accomplished by using one or more of the following methods.

- mowing
- hand cutting
- use of selective herbicides
- use of biological methods (planting compatible species to out-compete noncompatible ones)
- tree pruning and removal

a. Annual Patrols

Patrols by foot, snowmobile, and/or helicopter, are required to assess the conditions of the right-of-way in respect to all types of vegetation on or immediately adjacent to the right-of-way.

b. Tree Pruning

Trees left or planted in conjunction with selective cutting and/or screening will be pruned as required to maintain adequate clearance for safe and efficient operation. The work will be carried out by trained Hydro Forestry Tradesmen.

c. Selective Brush and Weed Control

In some areas the use of approved herbicides may be the most efficient and economical method of controlling unwanted growth. These materials are applied by Hydro's licensed Forestry Tradesmen who adhere to the regulations outlined in the Provincial Pesticides Act, and to Hydro's own specification for the use of herbicides.

7. Line Maintenance

Maintenance inspections are to be carried out on high voltage lines on a ten-year cycle. More frequent inspections of the facility may be carried out if unusual situations (frequent outages) arise. Foot patrols will be carried out annually and helicopters carry out inspections six times each year. Any observed irregularities, such as broken insulators, are repaired immediately. At major highway crossings, or in areas where pollutants are high, the insulators may have to be periodically washed with water.

8. Special Services

Ontario Hydro employs qualified landscape architects. These professionals can be made available to municipalities, counties, or townships, to help in drawing up or commenting on plans for parks or other compatible recreational facilities when deemed mutually appropriate along our rights-of-way.

Appendix C

Ontario Hydro: Presentation to the Solandt Commission on the Procedures to be Followed for the Construction of the Lennox G.S. to Oshawa 500 kV Transmission Line

The construction phase of a transmission line project follows after the establishment of the line route, the location of the line towers and the settlement of property agreements. The final location of the right-of-way and the location of each tower on the right-of-way is determined by a committee comprising representatives of our Construction, Engineering, Survey, Forestry and Property Departments. When these matters have been finalized, specifications are prepared and issued to the Lines and Stations Construction Department along with instructions to proceed with construction.

Prior to the start of any field activities an overall construction plan is developed. This plan identifies the requirement for access roads, construction methods to suit the various conditions to be encountered (such as terrain, type of soil, etc.), locations of material storage areas, manpower and equipment requirements, availability of accommodation facilities, labour and material supply in the areas through which the line will pass, and the rate of progress which will be required to meet the overall schedule.

When the construction period has been determined, a notice will be sent from the Construction office in Peterborough to residents advising them of the approximate time of the start of construction and the expected duration of the construction program. The Construction Supervisor will contact each resident before entering a property to commence work. At this time any particular problems regarding the use of roads, lanes, etc., can be discussed.

The roads which will be needed for access to the right-of-way and tower locations are investigated jointly with our Forestry Department at the time that they are developing their tree cutting and restoration plan for the right-of-way. At water crossings on these roads, culverts or other appropriate methods will be used with special attention given to prevention of erosion or sedimentation. On private lands, such crossings will be discussed with the property owner involved. In general, wherever possible, use will be made of existing township, county or private roads to gain access to the construction areas. In locations where standing fences cross the line right-of-way, permanent gates will be installed at the access roads. It is our practice to consult with the owner about the final location of such gates and arrangements for the operation of these gates during construction of the line. This matter is also co-ordinated with our Forestry Department who require the use of gates for future maintenance of the line.

The next stage in the construction program involves the installation of foundations to support the towers. The type of foundation to be installed at each tower location is dependent on the nature of the soil and the type of tower to be built. In swamp locations and areas where the subsoil is inadequate to support a tower with a normal-type foundation, the installation of piles will be necessary. Special towers, such as at angles in the line, at ends of the line, or at terminal locations, will require larger and heavier foundations. Such foundations require extensive excavation and placement of large quantities of concrete. The majority of the foundations will require concrete, which is delivered to the sites in concrete trucks. Construction equipment such as backhoes, trucks, compressors and other equipment items will be employed during the construction of the foundations.

The area disturbed during the construction of the foundations is kept to a minimum, and in those areas where tree removal or other treatment of the right-of-way is necessary, the area to be used for construction of the foundations is defined. Excavated materials which are not returned to the excavation will be disposed of by spreading around the tower foundation or by removal from the tower site.

Following the completion of the foundations, the next operation is the delivery of tower steel to each tower location in preparation for building the towers. The large quantities of steel required for this line will be transported from the material storage areas by suitable equipment. All possible efforts are made during this operation to minimize damage to fields and roads. However, a certain amount of damage to the terrain is to be anticipated, but such damage will be repaired upon completion of the work. Roads will be maintained as necessary.

The individual steel members are assembled together to form sections of the tower which are laid out on the ground in a manner suitable for erection - and which is normally done by means of a crane. If the location of the tower site is such that it is not accessible by crane without creating undue damage to the equipment or the terrain, the tower would be erected by a gin pole. This is a single structural member supported in a vertical position by guy ropes and used to raise the tower sections. This method is slower and more costly compared to the use of a crane and is only used when necessary.

The installation of the line conductors is the next operation. The technique employed for this work is known as 'tension stringing', in which the conductors are pulled through each tower under tension, keeping them off the ground at all times and thereby avoiding damage to the ground and also to the conductors. It is essential that conductors used on 500 kV lines are not damaged in any way, as this can affect the operation of the line. The first step in tension stringing is to install a light rope along the section of the line to be strung. These sections are usually about 30,000 ft. long. A helicopter is used to fly this rope along the right-of-way, depositing it on the ground

beside the towers. The rope is then raised from the ground to the tower along with the insulators which support the line conductors. A traveller or a pulley is attached to the insulator and the rope placed in the traveller to facilitate pulling it along the line. This rope is then used to pull in 1/2" steel cable, which in turn is used to pull in a 3/4" steel cable, which finally pulls through the line conductors in bundles of four.

After all of the conductors are pulled into place by this method, they are tightened to a specified tension. This tension ensures that the line maintains the correct ground clearance under all operating conditions. Following this, the conductors are clamped at each insulator and damping devices are installed on the conductors to limit vibration. Spacers are also installed in each span between the towers to maintain the required spacing between each of the four conductors in the bundle. This completes the stringing operation.

Specialized equipment is required for this method of stringing, and it is moved from point to point along the right-of-way as the stringing proceeds. This method is effective in minimizing damage to the terrain, as it avoids the need to move heavy equipment along the full length of the right-of-way.

To ensure that the line will operate efficiently when in service, it is necessary that the electrical ground resistance at each tower be as low as possible. To accomplish this a ground electrode is installed at each tower. If, because of soil conditions, the ground resistance at many of the towers is too high, additional grounding must be installed. The normal procedure in this case is to bury two continuous wires along the right-of-way, one at each side of the towers. These wires are normally buried to a depth of 18" in cultivated ground and 8" in bush areas and in rocky ground. The wires are installed by a tractor which carries the ground wire on reels and buries the wire as it proceeds down the right-of-way by means of a plow attachment. The wires are connected to each tower. An efficient grounding system on a transmission line provides lightning protection for the line and minimizes the chance of the line being interrupted as the result of lightning.

The final stage of construction is the clean-up of the right-of-way to be sure that all construction materials are removed. This is an on-going procedure during the construction of the line, but a final clean-up is also carried out. Any necessary repairs to fences, fields, and roads are completed. Grading, as required, at the tower sites is also completed in preparation for any further restoration required by our Forestry Department. The line is now ready for operation.

The construction of a facility such as a 500 kV transmission line, which requires the use of heavy equipment, transportation of large quantities of heavy materials, and all allied activities, does result in damage to the terrain over which the construction is carried out. We are very much aware of this and the problems which it can create and have

developed procedures to minimize damage. Where damage does occur, we are committed to carrying out necessary repairs. In recognition of this situation, a study was carried out to develop constraints on the construction of transmission lines to minimize the effect on the environment of normal construction activities. The results of this study are contained in a report entitled, "The Environmental Criteria for the Construction of Power Lines". Many of the points included in this report are based on our own experience and knowledge and also the experience of other utilities and organizations - and apply to the construction of lines at other voltages as well as 500 kV. Up to very recently, there has been no specific policy or legislation applicable to the protection of the environment during the construction of transmission lines, either in this province or outside of the province. The conditions set out in this report will form a part of the job specification, and a supervisor will be given the responsibility of ensuring that these conditions are fulfilled.

D.G. Johnson
Zone Manager, Peterborough
Ontario Hydro
Lines and Stations Construction
May 21, 1974

Ontario Hydro: Environmental Criteria for The Construction of Power Lines

The activities of the Lines and Stations Construction Department can significantly affect the success of Ontario Hydro's effort to meet the environmental concerns of society. The following criteria are to be used in the planning and execution of our field operations in a manner that will preserve and enhance the natural environment. If there is conflict between the project environmental spec. and the following criteria, the environmental specification shall govern.

General

- 1 All personnel working on a particular project shall be advised of the following general environmental constraints as well as the specific constraints, as made known through engineering instructions associated with that particular program.
- 1.2 An individual shall be designated on each project as the field contact for all matters concerning the environment. This may be a general foreman or other delegated individual.
- 1.3 Among other factors, equipment for a particular project shall be chosen with the maintenance of the environment in mind.
- 1.4 Construction activities shall be planned on a selective basis for those seasons of the year resulting in a minimum of environmental damage.
- 1.5 Natural water courses shall not be crossed except where permitted by the specification and with the approval of the Zone Superintendent.
- 1.6 Housekeeping and removal of surplus material and debris shall be continuous and integral with each construction activity. Disposal shall be either by burial (minimum of 2 feet cover) or by removal from R/W to an approved disposal area.
- 1.7 Construction forces shall not cut or destroy any trees without the prior consent of the Forestry Department.
- 1.8 Clearing and grading of construction areas will be minimal and done in such a manner as to prevent erosion and conform to the natural topography.
- 1.9 Grubbing shall be limited to that which is absolutely necessary and preferably removed to an inconspicuous area on the right-of-way, alternatively it shall be hauled to an approved disposal area.

- 1.10 Oil, gasoline and other pollutants shall not be discharged or buried on the right-of-way of other areas, but shall be removed to an approved disposal facility.
- 1.11 Burning of material shall be in accordance with Government and Hydro regulations and shall be minimized.
- 1.12 Dust, smoke, fumes, etc. shall be controlled in sensitive areas. Vehicles shall not be left idling.
- 1.13 Work shall be planned to minimize the vehicle trips over access roads.
- 1.14 Noise nuisance shall be considered and kept to a minimum.
- 1.15 Blasting shall not be done in or near streams.
- 1.16 Borrow pits shall not be opened without permission. Consideration shall be given to the use of established commercial pits and quarries.
- 1.17 Fences and gates shall be maintained in a state equal to or better than the condition in which they were found.
- 1.18 An effort shall be made to identify the location of tile drains before construction commences, using aerial photography, local knowledge etc.

2.0 Material Yards and Camps

- 2.1 Sites shall be so chosen that they are as inconspicuous as possible and compatible with the surrounding area.
- 2.2 They shall be maintained in a neat, tidy and respectable condition.
- 2.3 They shall be restored to their original or natural condition.
- 2.4 Disturbance of permanent vegetation shall be kept to a minimum.

3.0 Right-of-way Access

- 3.1 Where access has been specified as a result of an environmental study, deviation will not be permitted without the consent of the Project Engineer.
- 3.2 Established access facilities including local roads shall be utilized to the greatest extent possible.

- 3.3 Access roads, where possible, shall be confined to the R/W. However, where such would result in severe environmental damage, consideration shall be given to alternative access routes.
- 3.4 The routing of access roads shall take into consideration access to all future lines on the same right-of-way.
- 3.5 Where possible, access roads shall avoid steep slopes and wetlands.
- 3.6 In general, the width of access roads shall be a minimum and limited to 15 feet; however, on curves, widths may be increased to accommodate the longest component to be transported.
- 3.7 Rutting and the mixing of sub-soil and topsoil shall be minimized.
- 3.8 Where an access road is established it shall be used for all transport involved. Diversions shall be permitted on cultivated fields within the confines of the right-of-way to minimize rutting and crop damage.
- 3.9 When it becomes apparent that excessive marring, scarring or erosion damage is being initiated, immediate steps shall be taken to curtail such damage.
- 3.10 Sizing of ditch culverts shall have the approval of local control authorities.

4.0 Clearings for Tower Sites

- 4.1 Clearing of tower sites shall normally be carried out by the Forestry Department and shall be of minimum size as mutually agreed to by Construction and Forestry personnel.
- 4.2 Trees which are to remain in the work area shall be identified and protected.

5.0 Foundations

- 5.1 Trees in the vicinity of the tower that were not removed as a result of the clearing operation shall be preserved.
- 5.2 Disturbance of the vegetation and top soil shall be kept to a minimum.
- 5.3 All excavated top soil and sub soil shall be segregated for the purpose of restoring the site subsequent to the operation.

- 5.4 Care shall be taken to ensure that excavated material or other foreign matter will not enter natural water courses.
- 5.5 Surplus excavated material shall be spread to enhance the tower site except where specified to be removed from the site.
- 5.6 Surplus concrete, bentonite and other construction material shall be buried, hauled away or otherwise disposed of to minimize environmental impact.
- 5.7 The discharge from any pumping operation shall be arranged so that sediment will not enter any nearby streams.

6.0 Tower Assembly and Erection

- 6.1 Selection of methods and equipment shall recognize the environmental concerns of the project.
- 6.2 Care shall be exercised during the assembly and erection operations to ensure that disturbance to existing trees, shrubs, vegetation, etc. is kept to a minimum.

7.0 Stringing

- 7.1 Tension stringing techniques shall be used to avoid damage to trees and vegetation along the right-of-way. Conventional stringing methods may be employed where it is established that minimum damage will occur to the environment.
- 7.2 Vehicular travel along the right-of-way shall be minimized and limited to the access road where possible.
- 7.3 The location selected for stringing set-ups shall be carefully chosen by utilizing, where possible, existing cleared areas adjacent to established roads. The area required shall be kept to a minimum by the optimum arrangement of machines, conductor tie-downs and conductor reel storage.
- 7.4 The area of the set-up shall not be bladed or graded unless absolutely necessary.
- 7.5 Where possible, trenching for temporary anchors shall be avoided by utilizing screw-type, inclined logs or steel beam tie-downs etc.

- 7.6 Cable and wire clippings and other debris associated with the stringing operation shall be collected and removed to designated disposal areas each day.
- 7.7 Upon completion of the work at each set-up location, the area shall be cleaned up and left in a respectable condition.

8.0 Counterpoise

- 8.1 In sensitive areas such as natural water courses, consideration shall be given to the hand placement of counterpoise conductor.
- 8.2 Where selective cutting has been carried out, consideration shall be given to the use of light, narrow trenching and laying machines.
- 8.3 Care shall be taken to avoid the initiation of erosion channels by diversion of run-off onto undisturbed soil and/or by switch-back installation on steep slopes.

9.0 Clean-up

- 9.1 At the end of construction activities the right-of-way and all associated access roads shall be patrolled to ensure that all litter, hardware, and waste material including concrete has been disposed of and that all fences and gates have been left in a secure condition.
- 9.2 All temporary culverts shall be removed and the drainage courses, including embankments, restored to an acceptable condition.
- 9.3 All land which has been disturbed shall be restored to a reasonable state and shall include:
 - (a) The elimination of deep ruts and holes by filling or grading.
 - (b) Grading around tower sites and pole footings.
 - (c) Restoration of access roads to an acceptable condition consistent with final seeding and rehabilitation by the Forestry Department.
- 9.4 Upon the completion of all construction activities in an area, for example, between township limits, complete restoration shall be carried out as soon as possible.

Appendix D

Ontario Hydro: Effect of Locating the Lennox-Oshawa 500 kV Transmission on the Gatineau Right of Way

1.0 INTRODUCTION

At the request of the Solandt Commission, the effect of using the Gatineau right of way for part of the route of the Lennox-Oshawa right of way has been reviewed and the results of the review are contained in this submission.

2.0 GATINEAU RIGHT OF WAY

2.1 General

The Gatineau right of way runs from Toronto to Chats Falls, about 25 miles northwest of Ottawa on the Ottawa River. For most of its length, it has four single circuit 230 kV lines on it, the first of which was built in 1928 and the last in 1948. They were built to transmit hydroelectric power purchased in Quebec to Toronto and have, therefore, been an essential part of the bulk power system for many years. Under the terms of the existing contracts or letters of intent, Hydro-Quebec will supply Ontario with 1187 MW of power until November 1, 1976 and 1000 MW from then until May 31, 1977. In order to receive this power from Hydro-Quebec and to connect a maximum amount of Lennox generation into the system, it is necessary to have all the 230 kV Gatineau circuits in service. If any one circuit is out of service, the permissible delivery from Hydro-Quebec or the amount of Lennox generation must be reduced on the average by about 200 MW. During the period of the Quebec contracts, the load in the Ottawa area is largely supplied by the Quebec generation.

In 1977, when the Quebec contracts terminate, and the direct feed from the Quebec generation into the Ottawa area is therefore lost, the 230 kV lines on the Gatineau right of way are required to supply the Ottawa area load from Ontario sources until the 500 kV system is extended to Ottawa about 1980. After this time, as the system grows, the importance of the 230 kV Gatineau lines will become less significant, but they will remain useful and unless there is a strong incentive to remove them, they will be operated in parallel with the 500 kV system. If there is an incentive to remove them, and no significant loads have developed in certain areas, such as perhaps between Havelock and the Ottawa River, it may be possible to dispense with some portions of some of the circuits by replacing them with other transmission facilities. It is likely that four 230 kV circuits will be required

2.0 GATINEAU RIGHT OF WAY

indefinitely from Oshawa-Area TS as far as Peterborough, two as far as Havelock and some in the Ottawa area to supply area load.

2.2 500 kV Lines

In order to assess the effect of using the Gatineau right of way for the Lennox-Oshawa circuits, we have compared the approximate costs of three different ways of using the Gatineau right of way for the Lennox-Oshawa 500 kV lines as opposed to using the recommended route. The schemes are shown in the figures attached and described below.

Figure 1: "Recommended" Route

Figure 2: Gatineau - Keller Bridge - Hinchinbrooke Route. This route follows the Gatineau right of way to Keller Bridge and then the Hinchinbrooke line to Hinchinbrooke and then to Lennox.

Figure 3: Gatineau - Keller Bridge - Mt. Pleasant Route This route follows the Gatineau right of way to Keller Bridge, the Hinchinbrooke line part way to Hinchinbrooke and connects to Lennox via a new right of way connecting to the Lennox egress near Mount Pleasant.

Figure 4: Gatineau - North - Hinchinbrooke
A route following the Gatineau right of way to a point about 30 miles north of Hinchinbrooke and thence to Hinchinbrooke and Lennox.

In the economic comparison of the four alternatives, we have included the facilities required for a new generating site, called the Central Lake Ontario Site, which we expect will be located in the area between Cobourg and Brighton. This site was mentioned in the CAI/Hydro report, but was not included in the economics because we did not have Ontario Hydro Board or Government approval to seek a site in that area.

Also included are facilities within the study area to provide for a second right of way from the Wesleyville area to the west. Such a right of way would be required when a generating station is built on the Central Lake Ontario site or when the Wesleyville or Bowmanville sites are extended beyond the first stage. It is not anticipated that such right of way will be required until the mid-1980s.

2.0 GATINEAU RIGHT OF WAY

The results of the comparison of the four alternatives, including the estimated costs of transmission construction, property and system power losses, are tabulated below. These estimates cover the cost of facilities expected to be required by 1988 and include those required for the first generating station on the Darlington, Wesleyville and Central Lake Ontario sites and the first and second stations at Lennox. Some costs common to all alternatives have been omitted. The costs include the predicted escalation in costs and have been calculated using an interest rate of 9%.

Alternative	1974 Present Worth of Costs \$000,000's					
	Trans- mission Facil- ities	Additional Costs Compared to Alternative 1				Total
		Trans- mission	Losses	Prop- erty	230 kV Rebuilding	
1) Recommended	114	0	0	0	0	0
2) Gatineau- Keller Bridge- Hinchinbrooke	164	50	18	1	15-30	84-99
3) Gatineau- Keller Bridge- Mt. Pleasant	144	30	12	1	15-30	58-73
4) Gatineau-North- Hinchinbrooke	194	80	32	1	18-45	131-158

2.3 Losses

The economic value of future power losses in a transmission line cannot be calculated with great accuracy because of the difficulty of estimating future power flows in the line. However, the rapidly increasing cost of fuels has made the value of power losses a more important factor. It is estimated on the basis of a conservative estimate for the future 500 kV line loadings, that the extra line miles involved in the Gatineau route would increase the present worth of the cost of system losses by the amounts shown in the table in Section 2.2.

2.4 Property

The additional property cost for the Lennox-Oshawa portion of alternative 3 compared to alternative 1 was estimated in the CAI/Hydro report at \$1,000,000. This was based on a final width for the Gatineau right of way of about 550' east of Wesleyville and 720' west of Wesleyville.

2.0 GATINEAU RIGHT OF WAY

This additional cost will increase somewhat in alternatives 2 and 4 because of the longer lines, and if a greater final width is required; but such increases are not expected to have a significant effect on the comparison.

2.5 Cost of 230 kV Rebuilding

The cost of alternatives 2, 3 and 4 will also increase with respect to alternative 1 by the cost of any necessary rebuilding of the existing 230 kV Gatineau circuits. In the one extreme case, it may be assumed that environmental conditions would permit use of a new strip about 400' to 600' wide adjacent to the Gatineau right of way. In this case, the 500 kV lines could be built without disturbing the existing 230 kV circuits and the increase in cost would be zero. In the other extreme case, the object would be to use the minimum total width of right of way. This would require the complete replacement of the existing 230 kV lines by two new 2-circuit lines or one new 4-circuit line, and the increased cost would be about \$30,000,000 to \$45,000,000 depending on the route selected. Such rebuilding would be required because, as explained earlier, the 230 kV lines are required to be operated continuously until the 500 kV system is extended to the Ottawa area. Therefore, whenever the location of a 500 kV line interferes with an existing 230 kV line, the 230 kV line must first be replaced by a new one. In between these two extremes are several other possibilities involving various widths of new right of way.

For example, east of Wesleyville where only two 500 kV circuits are required for some years, if a new strip about 230' wide were used, one 500 kV line could be built with both circuits strung and operated with one circuit at 500 kV and the other at 230 kV. This would permit removal of one of the existing 230 kV circuits and the construction of a second new 500 kV line, which would then be similarly operated. In this example, the cost of keeping the 230 kV circuits in service would be reduced to about \$15,000,000.

Therefore, without doing a detailed study, it can be said that the cost of 230 kV rebuilding may be from \$15,000,000 to \$30,000,000 for alternatives 2 and 3; and from about \$18,000,000 to \$45,000,000 for alternative 4, assuming that the completely new right of way is not acceptable.

Any rebuilding scheme that involves sequences of construction will cause additional impact on the environment during the construction period and will probably introduce delays in the in-service date of the 500 kV facilities. Such delays

2.0 GATINEAU RIGHT OF WAY

will have the same effect as those discussed at the Port Hope hearings in connection with the suggested deferment of the hearings.

2.6 Conclusion

There are significantly higher costs involved in using the Gatineau right of way instead of the "Recommended Route" for the Lennox-Oshawa transmission, even if the indefinite costs of the possible 230 kV rebuilding are not included in the comparison.

The estimated range of all additional costs, depending on whether such costs of rebuilding are included, is:

Alternative 2 (Gatineau-Keller Bridge- Hinchinbrooke)	\$69,000,000 to \$99,000,000
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Alternative 3 (Gatineau-Keller Bridge- Mt. Pleasant)	\$43,000,000 to \$73,000,000
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Alternative 4 (Gatineau-North- Hinchinbrooke)	\$113,000,000 to \$158,000,000
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3.0 GENERAL ENVIRONMENTAL ASSESSMENT OF THE GATINEAU RIGHT OF WAY

3.1 General

A preliminary assessment of the environmental aspects of the various sections of right of way involved in alternatives 2, 3 and 4 has been made. No extensive field work has been carried out. In general, the shorter the right of way, the less the total environmental impact. This assessment, by right of way section, follows.

3.2 Assessment

3.2.1 Gatineau Right of Way Oshawa Area TS-Keller Bridge

For the most part, this section crosses high capability agriculture land, except near Pontypool and north of the town of Havelock; although in the area west of Keller Bridge, there are only pockets of class 1 land.

The problems incurred with overbuilding the Gatineau lines, that is replacing the existing 230 kV lines by

3.0 GENERAL ENVIRONMENTAL ASSESSMENT OF THE GATINEAU RIGHT OF WAY

by new 230 kV lines to the side of the right of way and building 500 kV in their place, are as follows:

- a) The number of construction phases is increased from one to at least three resulting in greater chance for physical environmental damage and greater economic hardship to farmers due to longer construction time.
- b) The greater numbers of towers and shorter span length would mean more obstructions for the farmer.
- c) The changes in tower locations could alter farming methods that have evolved since the Gatineau lines were built.
- d) Existing easements do not permit any rebuilding of the lines, and Hydro would be required to acquire new rights for the proposed rebuilding.

If consideration is given to building the new lines adjacent to the existing lines, effects on the physical environment would undoubtedly be less than an overbuild; but visually the lines would be a problem, for example, some diagonal road crossings would be one-half mile in length.

Restrictions on right of way widening are imposed by the presence of built-up areas (Pontypool, Norwood and Havelock) and new homes and barns constructed beside the Gatineau lines over the past thirty years.

The significant features of this section are:

- i) The existing right of way passes both close to and through cottage developments on Lakes Belmont and Crowe.
- ii) The right of way passes very close to and partially through development on the east and south sides of the village of Pontypool.
- iii) It passes through existing built-up sections of the villages of Havelock and Norwood.
- iv) There are a number of locations where the lines divide, in varying fashion, to go around buildings.

3.0 GENERAL ENVIRONMENTAL ASSESSMENT OF THE GATINEAU RIGHT OF WAY

3.2.2 Keller Bridge to Hinchinbrooke SS

A proposed alignment here would be adjacent to and south of the existing 230 kV line. This section of the line is almost entirely on the Canadian Shield, except for small pockets of till plains in Madoc and Elzevir Townships which are farmed.

While this section is lightly populated, the numerous rivers, creeks and undulating terrain will make construction difficult while attempting to minimize impacts. There are very few roads.

The significant feature of this section is some development at Keller Bridge.

3.2.3 Hinchinbrooke SS to Cataraqi TS

For approximately 10 miles south of Hinchinbrooke, numerous lakes and streams will have to be crossed by the line on the Canadian Shield. Below Hartington, on the Napanee till plain, agriculture is prevalent, although the soil is shallow in many places. There is a mixture of farming and cottage development.

The significant features of this section are:

- a) There are a 230 kV line and a 115 kV line on different rights of way in this area. An additional 230 kV line has been approved for construction on the 230 kV right of way.
- b) At certain locations because of the location of the existing 230 kV line close to lakes, the addition of more lines may be difficult.

3.2.4 Cataraqi to Lennox GS

The right of way traverses a clay plain, with limestone very close to the surface, especially in the forested areas. The type of forest cover (cedar) lends itself to selective cutting.

The agricultural land is of varying qualities. There is a limited amount of rural estate development and some strip development along some significant roads, e.g., Highway #2.

3.0 GENERAL ENVIRONMENTAL ASSESSMENT OF THE GATINEAU RIGHT OF WAY

The significant features of this section are:

- a) For some distance out of the generating station, the right of way parallels the scenic Highway #33 on the north side of the North Channel.
- b) The crossings of Highways #2 and #401 would require a detailed study.

3.2.5 Possible Dropoff from the Gatineau Right of Way to Central Lake Ontario GS

If Central Lake Ontario GS were connected to the Gatineau right of way by a route to the east of Rice Lake near Hastings, it would cross approximately 30 miles of predominately high capability farmland.

3.2.6 Possible Dropoff from the Keller Bridge x Hinchinbrooke Right of Way to Mt. Pleasant Jct

South of the 230 kV line, for 5 miles, the proposed route crosses the Canadian Shield. South of Otter Creek, in Hungerford Township, the line crosses shallow till over limestone before reaching higher capability agricultural land in mid-Richmond Township.

The impacts of this line would be light, generally speaking.

3.2.7 Keller Bridge-Vicinity of Donaldson-Hinchinbrooke

This section is entirely on the Canadian Shield. In general, the soil covering the bedrock is shallow. The major impact would be visual, particularly in the resort areas. The 500 kV towers would have a greater visual impact in such areas than the existing 230 kV and 115 kV structures.

The significant features of this section are:

- a) There is considerable cottage development northeast of Keller Bridge, where the Gatineau right of way follows a narrow piece of land between Mississagagon and Kashwakamak Lakes and north of Hinchinbrooke near Sharbot and Bobs Lakes.
- b) The crossing of Highway #7 would require a detailed study.

Appendix E



ONTARIO
EXECUTIVE COUNCIL OFFICE

OC-836/73

Copy of an Order-in-Council approved by His Honour the Lieutenant Governor, dated the 21st day of March, A.D. 1973.

The Committee of Council have had under consideration the report of the Honourable the Provincial Secretary for Resources Development, dated the 21st day of March, 1973, wherein he states that,-

WHEREAS by Order-in-Council numbered OC-2053/72, dated the 21st day of June, 1972, as amended by Order-in-Council numbered OC-2947/72, dated September 13th, 1972,

Dr. Omond Solandt was appointed, pursuant to the provisions of The Public Inquiries Act, 1971, to inquire into the transmission of power from Nanticoke to Pickering:

AND WHEREAS it is deemed desirable to extend the terms of reference as set out in the said Order-in-Council numbered OC-2053/72, to include an examination of the proposed route of hydro transmission facilities between Oshawa and Lennox:

The Honourable the Provincial Secretary for Resources Development recommends that the said terms of reference of the Solandt Commission be extended as follows:

- (1) to inquire into the most appropriate route or routes for the transmission of power to the Toronto load centre from Ontario Hydro's existing Lennox Generating Station and



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proposed stations at Wesleyville and Bowmanville. This study will include the entire area between Napanee and Oshawa, and will give particular consideration to social and environmental as well as economic factors.

- (ii) in the achievement of the foregoing the Commission should, following public submission to the Commission of the Ontario Hydro report resulting from the studies of this area presently being undertaken by Ontario Hydro and Commonwealth Associates, Inc., and which involve public participation, provide full opportunity for all interested individuals and organizations to discuss their views with the Commission. To ensure the attainment of this objective, the Commission should at that time invite written briefs and hold public hearings, under the terms of the Public Inquiries Act.
- (iii) further, but not to the exclusion of other matters, the Commission is to study and make recommendations on:
- the design of surface installations such as towers, transforming stations, etc.;
 - policies for multiple use of the transmission corridor;
 - ecological practices for maintaining the transmission corridor;



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- alternative methods for determining the routing of future transmission corridors; and
- other policies, such as land-use planning, which might have a bearing on future routings of transmission corridors.

The Committee of Council concur in the recommendation of the Honourable the Provincial Secretary for Resources Development and advise that the same be acted on.

Certified,

A handwritten signature in cursive script, appearing to read "J. F. Young".

Clerk, Executive Council.

Notice of Public Hearings into the Transmission of Power from Lennox to Oshawa

1. The Province of Ontario appointed Dr. Omond Solandt, under the Public Inquiries Act, by Order-in-Council OC-836/73 dated the 21st day of March, 1973, to inquire into the most appropriate route or routes for the transmission of power to the Oshawa area Transformer Station from Ontario Hydro's existing Lennox Generating Station and proposed stations at Wesleyville and Bowmanville.
2. Commissioner Solandt has requested Ontario Hydro to file a written (technical) report, pertaining to this matter and to present an oral summary of the report to interested parties at a public and press conference beginning at 10 a.m., on April 2, 1974, in the Royal Canadian Legion Hall, 99 Toronto Road, Port Hope, Ontario.
3. Any interested party who wishes to present a brief should file a copy of such brief with the Secretary on or before April 26, 1974, indicating at the same time whether he wishes to speak at a subsequent public hearing and, if so, whether at Port Hope or at Belleville.
4. Any other interested party who wishes to make oral representations at the subsequent public hearings, either personally or through a representative, should indicate his intent to do so in writing to the Secretary, on or before April 26, 1974. Such parties should specify in writing the area of their concern and indicate the nature of the testimony which they wish to give at the subsequent hearings, and whether at Port Hope or at Belleville.
5. Commissioner Solandt will hold a pre-hearing, beginning at 10 a.m., on April 29, 1974, in the Royal Canadian Legion Hall, Port Hope, in order that the schedule and procedures of the subsequent public hearings may be discussed with interested parties.
6. Commissioner Solandt will hold public hearings, beginning at 9:00 a.m., in the Royal Canadian Legion Hall, Port Hope, on May 8, 9, 10, 22, 23, 24, 1974, (and on such additional days as may be required); and at the Four Seasons Hotel, 11 Bay Bridges Road, Belleville, on May 15, 16, 17, 29, 30, 31, 1974, (and on such additional days as may be required), in order that interested parties may have an opportunity to ask questions of Ontario Hydro and to present evidence.
7. To accommodate special circumstances, and unique local concerns, Commissioner Solandt will consider requests, by interested parties, to hold additional hearings in other parts of Ontario, either day or evening sessions. All such requests, however, should be filed with the Secretary on or before April 26, 1974.
8. Copies of Ontario Hydro's report and recommendations will be on view in area Municipal offices, and the Solandt Commission office. Copies of all briefs filed will be on view at the Solandt Commission office, the Royal Canadian Legion Hall in Port Hope, and the Ontario Hydro Eastern Region Office, 420 Dundas Street East, Belleville. Individual copies of Ontario Hydro's report may be purchased from the Ontario Government Bookstore, 880 Bay Street, Toronto.

For further information, please contact:

Neil B. Cole,
Secretary,
The Solandt Commission,
9th Floor, Ferguson Block,
Queen's Park, Toronto, Ontario.
(416) 965-1431

Appendix C

Solandt Commission
— Hydro Inquiry —

**Notice of
additional public
hearings into the
transmission of
power from
Lennox to Oshawa**

1. Take notice that the Solandt Commission will resume its hearing into the inquiry of the transmission of power from Oshawa to Lennox on November 6th, 1974 beginning at 9:00 a.m. in the United Church of Canada Auditorium, Mill & Emily Streets, Newcastle and for such additional days as may be required and on November 13th, 1974 beginning at 8:00 p.m. in the Kendal Public School, Kendal and for such additional days as may be required.

2. At the previous meetings of the Commission there was public support for alternative routes both north and south of the route proposed by Ontario Hydro in the western part of the study area. The Commission retained Mr. T.W. Sparling to prepare the additional information required for a careful study of these alternatives. The specific purpose of the forthcoming meetings will be to consider these alternative routings and evaluate the feasibility of a more northern and southern route as proposed by the public. The Newcastle meeting will emphasize the southern alternative and the Kendal meeting will emphasize the northern alternative.

3. Any interested parties who wish to present a brief or make oral representations at the forthcoming public meetings, either personally or through a representative, should indicate their intent to do so in writing to the Secretary, on or before October 28th, 1974. Such parties should specify in writing the area of their concern and indicate the nature of the testimony which they wish to give at the forthcoming meetings, and whether they wish to speak at Newcastle (day) or Kendal (evening).

4. The procedures for the continuation of the hearings will be that previously established by the Commission.

5. Ontario Hydro's report and the Sparling study will be on view in area municipal offices and the Solandt Commission office. Ontario Hydro's report may be purchased from the Ontario Government Bookstore, 880 Bay Street, Toronto, and summaries obtained from Ontario Hydro, Public Relations Division, 620 University Avenue, Toronto 368-6767, local 25729. Copies of the Sparling study are available through the Solandt Commission office. Copies of all briefs filed and a map of alternative alignments will be on view in the offices of the Town of Newcastle, 40 Temperance St., Bowmanville, the Township of Hope, 72 Walton St., Port Hope, the Kendal Public School, Kendal and the Solandt Commission office.

For further information, please contact:

Linda R. White,
Secretary,
Solandt Commission
9th Floor, Ferguson Block,
Queen's Park, Toronto, Ontario.
(416) 965-1431

Appendix H

Solandt Commission Hearings
April 29th, 1974 to January 20th, 1975
Chronology and Participants

I Principal Hearings

April 29th, 1974
Port Hope Pre-hearing, to consider the proposed schedule of events and procedures. A request was made by representatives of the agricultural community for a postponement of the hearings to September, 1974, owing to the demands of the spring/summer farming season; this was taken under consideration by the Commissioner for decision at the next scheduled session on May 8th.

May 8th, 1974
Port Hope Presentation by and cross-examination of Ontario Hydro/Commonwealth Associations Inc. re: Public Participation and Communication Program, Mr. C.L. Taylor, Public Relations Division, Ontario Hydro.

Presentation by and cross-examination of Ontario Hydro: Possible Consequences of Further Delay in Determining a Route for the 500 kV Connections from Lennox GS - Mr. G.B. Pearson, System Planning Division.

Following this testimony, the Commissioner decided against delaying the hearings until the fall but, at the request of representatives of the agricultural community, agreed to postpone the next session of the hearings for two weeks, (thereby cancelling sessions scheduled for May 9, 10, 15, 16 and 17), to allow further opportunity for preparation by participants.

The day's session closed with a further presentation by and cross-examination of Ontario Hydro: Need For 500 kV Connection Between Lennox GS and Oshawa TS - Mr. G.B. Pearson, System Planning Division.

May 22nd, 1974
Port Hope Presentation by and cross-examination of Ontario Hydro: Newly Revised Property Policies - Mr. N.J. McMurtrie, Director, Property Division.

Presentation by and cross-examination of Ontario Hydro: Potential Visual Impact of 500 kV Transmission Line Towers Adjacent to Highway 401 - Mr. J.H. Murchison, Forestry.

Presentation by and cross-examination of a joint Ontario Hydro/Commonwealth Associates Inc. panel: The Conduct of The Transmission Line Siting Study and The Selection And Details of The Recommended Route - Ontario Hydro: Mr. J.S. Sedgwick, Transmission and Distribution Projects Division; Commonwealth Associates Inc: Mr. R.G. Hubbard, Director, Landplan Systems Division; Mr. L.B. Hartman, Project Coordinator; Ms. E.S. Beyer, Planner; Mr. F.L. Bohl, Regional Planner/Systems Analyst.

May 23rd, 1974
Port Hope

Continuation of cross-examination of the Ontario Hydro/Commonwealth Associates Inc. panel.

Presentation by and cross-examination of Ontario Hydro: Transmission Line Construction Practices - Mr. D.G. Johnson, Construction Division.

Presentation by and cross-examination of Ontario Hydro: Forestry Practices - Mr. S.T. Griffiths, Forestry.

Presentation of oral submissions:

Dr. M. Michael	- Regional Municipality of Durham
Mr. W. Winterhalt	- City of Oshawa
Mr. G. Henry	- Durham County Federation of Agriculture
Mr. J. McComb	- Residents of Concession 8, Cramahe Township
Mr. A. Bebee	- Personal submission
Mr. J. Parkinson,	
Q.C.	- Bethany Sand & Gravel
Mr. D. Earle	- Personal submission
Mr. G. Finlayson	- Personal submission
Mr. W. Fleury	- Personal submission
Mr. R. Wisener	- Foothill Farms
Mr. P. Giles	- Personal submission
Mr. J. Good	- Personal submission

May 24th, 1974
Port Hope

Mr. G. Sinclair	- Messrs. M. Frew, R. McDerment, E. Patrzek
Mr. L. Lambier	- Durham/Northumberland Flue-Cured Tobacco Growers Association
Mr. P. Rolfe	- Personal submission
Mrs. M. Westheuser	- Personal submission
Mr. R. LeSueur	- Personal submission
Mrs. B. Lawson	- Personal submission

Presentation by and cross-examination of Ontario Hydro: Possible Effects of 500 kV Transmission Lines on Radio/TV Reception - Mr. J.S. Sedgwick, Transmission and Distribution Projects Division.

May 29th, 1974
Belleville

Presentation by and cross-examination of Ontario Hydro: Newly Revised Property Policies - Mr. N.J. McMurtrie, Property Division.

Presentation by and cross-examination of Ontario Hydro: The Need For The Lennox-Oshawa 500 kV Transmission Line and Connections to Wesleyville and Bowmanville - Mr. B. Pearson, System Planning Division.

Presentation by and cross-examination of the joint Ontario Hydro/Commonwealth Associates Inc. panel: The Conduct of The Transmission Line Siting Study and The Selection and Details of The Recommended Route - Ontario Hydro: Mr. J.S. Sedgwick, Transmission and Distribution Projects Division; Commonwealth Associates Inc.: Mr. R.G. Hubbard, Director, Landplan Systems Division; Mr. L.B. Hartman, Project Coordinator; Ms. E.S. Beyer, Planner; Mr. F.L. Bohl, Regional Planner/Systems Analyst.

May 30th, 1974
Belleville

Continuation of cross-examination of the Ontario Hydro/Commonwealth Associates Inc. panel.

Presentation by and cross-examination of Ontario Hydro: Forestry Practices - Mr. S.T. Griffiths, Forestry.

Presentation of oral submissions:

Mr. G. Hanna	- Bata Industries
Reeve H. Casey	- Thurlow Township
Mr. W. Walsh	- Tyendinaga Township
Mr. R. Cunningham	- Ontario Federation of Agriculture
Mr. J. Bergveld	- Personal submission
Mr. B. Forsyth	- Personal submission
Ms. J. Pepino	- Mr. H. Knowles

May 31st, 1974
Belleville

Continuation of presentation of oral submissions:

Mr. N. Neilson	- Personal submission
Mr. H. Gray	- Personal submission
Mrs. M. Robinson	- Personal submission
Mr. W. Whitley	- Active Farms Ltd.
Mr. B. Kenny	- Quinte Planning Board
Mr. P. Cox	- Personal submission
Mr. R. Barlow	- Personal submission
Ms. C. Titcombe	- Personal submission
Mr. R. Taylor	- Cablevue Quinte Ltd.
Mr. E. Ross	- Personal submission

June 5th, 1974
Port Hope

Presentation of individual views by, and subsequent cross-examination of, a panel of representatives of provincial government ministries:

Mr. G.H. Henry, Soils & Crops Branch, Ministry of Food and Agriculture; Mr. J. Slot, Food Land Development Committee, Ministry of Agriculture and Food; Mr. D.J. Birnbaum, Environmental Assessment Branch, Ministry of the Environment; Mr. D. Shatil, Environmental Assessment Branch, Ministry of the Environment; Mr. L. McCoy, Eastern Region Field Office, Ministry of Natural Resources.

Further presentation by and cross-examination of Ontario Hydro as to the choice of their recommended route in preference to the possible use of the existing Gatineau Transmission Line - Mr. S.T. Griffiths, Forestry Department.

Further presentation of oral submissions:

Mr. A. O'Brien - Personal submission
Mr. L. Oxley - Personal submission
Rev. A. Lawson - Personal submission

Concluding Remarks: Commissioner

II Local Hearings

- | | |
|--|---|
| 1. Monday, June 3rd
8:30 p.m. - 11 p.m. | <u>Hampton</u>
M.J. Hobbs Public School |
| 2. Tuesday, June 4th
8:30 p.m. - 11:30 p.m. | <u>Lower Cold Springs</u>
Hamilton Township Hall |
| 3. Thursday, June 6th
8:30 p.m. - 11:30 p.m. | <u>Kendal</u>
Kendal Public School |
| 4. Tuesday, June 11th
8:30 p.m. - 12:00 p.m. | <u>Stockdale</u>
Stockdale Public School |
| 5. Wednesday, June 12th
8:30 p.m. - 1:30 a.m. | <u>Honeywell Corners</u>
Harmony Public School |

At these local meetings, the Commission heard testimony on local issues and concerns, both from scheduled speakers and members of the general audience in attendance.

Note: Serving as Counsel for Ontario Hydro during these sessions of the Commission Hearings were Messrs. J.B. Southey, Q.C. and B.B. Campbell.

November 6th, 1974
Newcastle

Mr. T.W. Sparling presentation - "An Evaluation of Alternate Routes" - southern alternatives.

Town of Newcastle - Mayor G. Rickard
- Councillor K. Entwisle
G. Stapleton - Township of Hope Planning Board
Mr. G. Rykeu - Council of United Townships
Mr. E.C. Lake - petition and personal submission
Mr. J.R. Yates - personal submission
Mrs. D. Nichols - personal submission
Mr. D. Budd - personal submission
Mr. S. MacKay - personal submission
Mr. P. Cane - personal submission

November 7th, 1974
Newcastle

Ontario Hydro presentation regarding Gatineau-Lennox, Ottawa-Cornwall - Mr. G.B. Pearson

Ministry of the Environment
- Mr. D.J. Birnbaum

November 13th, 1974
Kendal

T.W. Sparling presentation of northern alternative with general reference to southern alternatives

Regional Municipality of Durham
- Mr. D. Clarke
Ministry of Agriculture & Food
- Mr. C. MacGregor
Town of Newcastle - Mayor G. Rickard
Ganaraska Regions Conservation Authority
- Mr. R. Hodgins
Durham Federation of Agriculture
- Mr. B. Taylor
Durham & Northumberland Flue Cured Tobacco Growers' Association
- Mr. L. Lambier
Mr. H. Worrall - personal submission
Mr. J. Yarnell - Foothills Farms Trust

November 14th, 1974
Kendal

Mr. B. King - Sierra Club
Mr. L. Carlson - personal submission
Mr. K. Lya11 - personal submission

November 26th, 1974
Newcastle

Presentation by Mr. T.W. Sparling on the feasibility of the Gatineau Right-of-Way as a 500 kV corridor to connect Lennox, Wesleyville and Darlington Generating Stations to the Oshawa Transformer Station

- Mr. E. Duncan - Newcastle-on-the-Lake Ratepayers Association
- Mr. Wm. Peden - Pollution Probe
- Mr. J. Clifton - The Village of Tyrone & Surrounding Community Association

November 27th, 1974
Port Hope

The Ganaraska Forest Panel presentation and discussion of effects of a 500 kV right-of-way on the forest

- Panel members:
- Dr. V.J. Nordin, Dean,
Faculty of Forestry,
University of Toronto
 - Dr. C.H.D. Clarke,
Biologist, retired,
Dept. of Lands & Forests,
Wildlife & Fisheries Branch
 - Mr. Douglas Sadler,
Outdoor Education
 - Mr. Roy Forrester,
Ganaraska Region Conservation
Authority
 - Mr. Ralph Lockhart,
Forrester,
Ministry of Natural Resources
 - Mr. Leslie McCoy,
Ministry of Natural Resources
- Mr. K. Wilson - Concerned Citizens of Hope Township

January 20th, 1975
Cannifton

At the request of the Township of Thurlow and the Hastings County Federation of Agriculture a hearing was held in the Township to enable further submissions to be presented.

Ontario Hydro Property Policy and Practices was presented by Mr. N.J. McMurtrie, Director, Property Division.

January 20th, 1975
Cannifton

Mr. I. May	- Hastings County Federation of Agriculture
Mr. Wm. Langstaff	- Sidney Township Residents
Mr. Borden Forsythe	- personal submission
Reeve H. Casey	-
Mr. G. Meyers	-
Mr. C. MacGregor	- Ministry of Agriculture & Food
Mr. G. Beer	- Thurlow Township Council
Mr. C. Rollins, M.P.P.	

Appendix J

Solandt Commission, 1974: Exhibits

74-A Ontario Hydro

- 74-A-1 Ontario Hydro: 500 kV Transmission Line Right-of-Way:
Lennox-Oshawa: Environmental Report
- 74-A-1a Ontario Hydro: 500 kV Transmission Line Right-of-Way:
Lennox-Oshawa: Environmental Report; pages 240-249,
revised and corrected 'Lennox-Oshawa Route Tabulations'
- 74-A-2 Ontario Hydro: 500 kV Transmission Line Right-of-Way:
Lennox-Oshawa: Environmental Study: Summary Report
- 74-A-3 Ontario Hydro: 500 kV Transmission Line Right-of-way:
Lennox-Oshawa: Technical Report: Corridor Selection Methodology
- 74-A-4 Memorandum: "1974: Lennox-Oshawa Study: Distribution of
Information"
- 74-A-5 Mass Mailing Piece: Lennox-Oshawa: Preferred and Alternative
Routes Map
- 74-A-6 Submission to the Solandt Commission: "Possible Consequences
of Future Delay in Determining a Route for the 500 kV
Connections from Lennox GS"
- 74-A-7 Submission to the Solandt Commission: "Need for 500 kV
Connection between Lennox GS and Oshawa Area TS"
- 74-A-8 Presentation to the Solandt Commission - May 22, 1974:
"Property Policies and Practices of Ontario Hydro"
- 74-A-9 Presentation to the Solandt Commission: "On the Procedures
to be Followed for the Construction of the Lennox GS to
Oshawa 500 kV Transmission Line"
- 74-A-10 Presentation to the Solandt Commission: "System Maintenance
Division: Practices and Procedures"
- 74-A-10a Presentation to the Solandt Commission: "System Maintenance
Division: Practices and Procedures" - 35 mm Illustrative
Slides
- 74-A-10b Map of Study Area and north, keyed by location to 35 mm
Illustrative Slides
- 74-A-11 Diagram: "Agricultural Tower Clearance: 500,000 Volt Double
Circuit Tower"

- 74-A-12 Table: "Lennox-Oshawa Study: Agricultural Acreages Affected by the Recommended Route"
- 74-A-13 Table: "Land Use Comparison: Gatineau Right-of-Way and Lennox-Oshawa Recommended Route"
- 74-A-14 Photomontages: "Potential Visual Impact of Towers located along Highway 401" (Selected Sites)
- 74-A-15 Map: "Soil Capability for Agriculture", Covering Both Study Area and North to the Gatineau Right-of-Way
- 74-A-15 1.2 Diagram of Facilities included in the Estimates of Costs to The Mid-1980's
- 74-A-15 2.2 Diagram of Facilities included in the Estimates of Costs to The Mid-1990's
- 74-A-16 Presentation to Solandt Commission - Selective Cutting and Maintenance Practices Relating to Ganaraska Forest
- 74-A-17 Construction of a 500 kV Transmission Line Through The Ganaraska Forest Reserve
- 74-A-18 Effect of Extending the 500 kV System to Ottawa and Cornwall on the Choice of Route for the Lennox-Oshawa Transmission
- 74-A-19 Effect of Locating the Lennox-Oshawa 500 kV Transmission on the Gatineau Right-of-Way
- 74-A-20 Comparison of Facilities Required West of the Vicinity of Rossmount for Alternative Routes Evaluated by Mr. T.W. Sparling in a Report Dated October 7, 1974
- 74-A-21 Diagrams (3) on possible tower combinations on the Gatineau Rights-of-Way (a,b,c)
- 74-A-22 Topographical Map - Western Section
Hydro/Commonwealth Alternate
- 74-A-23 Topographical Map - Western Section
Highway 401 South Alternate
re. T.W. Sparling Study
- 74-A-24 Topographical Map - Western Section
Highway 401 North Alternate
re. T.W. Sparling Study
- 74-A-25 Topographical Map - Western Section -
Ganaraska Alternate
re. T.W. Sparling Study

74-B Ontario Government/Federal Government

- 74-B-1 Hon. W.A. Stewart, Ontario Ministry of Agriculture and Food
- 74-B-1a Mr. Garnet Mills, Ontario Ministry of Agriculture and Food
- 74-B-1b Mr. Garnet Mills, Ontario Ministry of Agriculture and Food
- 74-B-1c "Evaluation and Comments on Alternative Corridor Locations for Ontario Hydro's 500 kV Transmission Line Right-of-Way: June 5, 1974", Ontario Ministry of Agriculture and Food
- 74-B-1d "Submission to Solandt Commission Public Hearings" Ministry of Agriculture & Food - Nov. 13, 1974
- 74-B-2 Hon. C. Bennett, Ontario Ministry of Industry and Tourism
- 74-B-3 Hon. R. Brunelle, Ontario Ministry of Community and Social Services
- 74-B-4 Hon. L. Bernier, Ontario Ministry of Natural Resources
- 74-B-5 Mr. G. Johnston, Planning Division, Ontario Ministry of Transportation and Communications
- 74-B-6 Hon. W. Newman, Ontario Ministry of the Environment
- 74-B-7 Mr. A.S. Denov, Regional Planning Branch, (Central Ontario Region), Ontario Ministry of Treasury, Economics and Intergovernmental Affairs
- 74-B-8 Mr. A. Davidson, Assistant Deputy Minister, Parks Canada, Federal Department of Indian and Northern Affairs.

74-D Municipal Governments

- 74-D-1 Town of Cobourg
- 74-D-2 Town of Newcastle
- 74-D-2a Town of Newcastle Nov. 6/74
- 74-D-2b Town of Newcastle April 20/74
- 74-D-2c Town of Newcastle Nov. 12/74
- 74-D-3 Regional Municipality of Durham
- 74-D-3a Regional Municipality of Durham
- 74-D-3b Regional Municipality of Durham
- 74-D-4 Town of Cobourg
- 74-D-5 Township of Tyendinaga
- 74-D-6 City of Oshawa: Department of Planning and Development
- 74-D-6a City of Oshawa
- 74-D-7 Township of Thurlow
- 74-D-8 Township of Brighton
- 74-D-9 Quinte Planning Board
- 74-D-10 Township of Sidney
- 74-D-10a Township of Sidney
- 74-D-11 Township of Hope
- 74-D-11a Township of Hope Planning Board
- 74-D-11b Township of Hope Planning Board
- 74-D-12 Town of Newcastle
- 74-D-13 Town of Newcastle - Kirk Entwisle, Councillor
- 74-D-13a Certified Copy of Resolution #C-74-1189 dated 4/11/74
signed Gertrude Gray, Dep. Clerk
- 74-D-13b Letter to Kirk Entwisle from Tilley, Carson & Findlay

74-E Groups and Associations

- 74-E-1 Pollution Probe
- 74-E-2 Tyendinaga Township Citizens
- 74-E-3 Durham County Federation of Agriculture
- 74-E-4 Durham County Federation of Agriculture
- 74-E-4a Durham Federation of Agriculture - Bruce Taylor
dated Nov. 13/74
- 74-E-5 Carole Titcombe and Petitioners (Thurlow Township)
- 74-E-5a Carole Titcombe and Petitioners (Thurlow Township)
- 74-E-6 Residents of Thurlow Township
- 74-E-7 Tyendinaga Township Citizens
- 74-E-8 Durham County Federation of Agriculture
- 74-E-8a Durham County Federation of Agriculture
- 74-E-9 Sidney Township Residents
- 74-E-9a Sidney Township Residents
- 74-E-9b Sidney Township Residents - 20/1/75
- 74-E-10 Northumberland County Federation of Agriculture
- 74-E-11 Ontario Federation of Agriculture
- 74-E-11a Ontario Federation of Agriculture
- 74-E-12 Durham and Northumberland Flue-Cured Tobacco Growers'
Association
- 74-E-12a Durham and Northumberland Flue-Cured Tobacco Growers'
Association
- 74-E-12b Durham and Northumberland Flue-Cured Tobacco Growers'
Association
- 14-E-13 Residents of Concession 8, Cramahe Township
- 74-E-13a Residents of Concession 8, Cramahe Township

74-E-14 Concerned Citizens of Hamilton Township
74-E-14a Concerned Citizens of Hamilton Township
74-E-15 Christian Farmers' Federation
74-E-16 Residents of Cramahe North and Brighton Townships
74-E-17 Residents of Cramahe and Brighton Townships
74-E-18 Sierra Club of Ontario
74-E-18a Sierra Club of Ontario
74-E-18b Sierra Club of Ontario - Bruce King
74-E-19 Hastings County Federation of Agriculture
74-E-19a Hastings County Federation of Agriculture - Ivan May - 20/1/75
74-E-20 E.P. Morris and Petitioners (Sidney Township)
74-E-21 Federation of Ontario Naturalists
74-E-22 Civic Environment Committee
74-E-23 Council of United Townships
74-E-23a Council of United Townships
74-E-24 Grey County Hydro Corridor Committee
74-E-25 Petition - Residents of Town of Newcastle
75-E-26 Ganaraska Region Conservation Authority
74-E-27 The Newcastle-on-the-Lake Ratepayers Association
74-E-28 Energy & Resources Team at Pollution Probe
74-E-29 Village of Tyrone & Surroundings Community Association
74-E-29a Village of Tyrone & Surroundings Community Association -
Mr. and Mrs. B. Heming
74-E-30 Concerned Citizens of Hope Township
74-E-30a Petition - Concerned Citizens of Hope Township

74-F Individuals

74-F-1 J. Vainstein
74-F-2 H. Gray
74-F-2a H. Gray
74-F-3 J. LaPointe
74-F-4 C. Cooper
74-F-5 J.D. Grant
74-F-6 D. Dietlien
74-F-7 L. Leoen
74-F-8 G. Todd & R. Todd
74-F-9 A.R. Paterson
74-F-10 H. MacDonald
74-F-11 M. Bishop
74-F-12 A. Jamieson
74-F-13 K. McKeown
74-F-14 P.A.K. Giles
74-F-15 M. Dickinson
74-F-16 R. Webber & A. Webber
74-F-17 Bethany Sand & Gravel
74-F-17a Bethany Sand & Gravel
74-F-17b Bethany Sand & Gravel
74-F-18 Mrs. M.V. Cassidy
74-F-18a Mrs. M.V. Cassidy
74-F-18b Mrs. M.V. Cassidy
74-F-18c Mrs. M.V. Cassidy
74-F-19 Bata Industries Ltd.
74-F-19a Bata Industries Ltd.

74-F-20 J.P.R. Wadsworth
74-F-20a J.P.R. Wadsworth
74-F-21 S. Warner & R. Warner
74-F-22 Cablevue Quinte Ltd.
74-F-22a Cablevue Quinte Ltd.
74-F-23 G. Kappler
74-F-23a G. Kappler
74-F-23b G. Kappler
74-F-24 M.R. Browning
74-F-25 R.V. LeSueur
74-F-26 Mrs. M. Westheuser
74-F-26a Mrs. M. Westheuser
74-F-27 O. Konzelmann
74-F-27a O. Konzelmann
74-F-28 G. Todd & R. Todd
74-F-28a Mr. & Mrs. Ross Todd
74-F-29 J.H. Rutherford
74-F-30 K.P. Thompson
74-F-31 Mrs. J.H. Good
74-F-32 G.B. Shand
74-F-33 S.J. Vaile, M.D.
74-F-34 L.R. Sawyer
74-F-35 P.J. Rolfe
74-F-35a P.J. Rolfe
74-F-36 Foothill Farms Trust
74-F-36a Foothill Farms Trust - R.A. Gunn

- 74-F-37 M.G. Malloy
- 74-F-38 Heinz E. Bolliger Real Estate Ltd., Trustee, and
Active Farms Ltd.
- 74-F-38a Heinz E. Bolliger Real Estate Ltd., Trustee, and
Active Farms Ltd.
- 74-F-39 P.J. Cox
- 74-F-39a P.J. Cox
- 74-F-39b P.J. Cox
- 74-F-40 R. Titcombe, M.D.
- 74-F-40a R. Titcombe, M.D.
- 74-F-41 W.E. Fleury
- 74-F-42 B. Wannamaker & J. Wannamaker,
E. Morris & I. Morris
- 74-F-43 B. Liang & M. Liang
- 74-F-44 H.J. McFarland Construction Co. Ltd.
- 74-F-45 C. Brethour & A. brethour
- 74-F-46 C. Jibb, F. Gordon, C. Baptist and S.A. Hearst
- 74-F-47 D.W.H. Brasier
- 74-F-47a D.W.H. Brasier
- 74-F-48 D. Earle
- 74-F-48a D. Earle
- 74-F-49 G.W. Finlayson
- 74-F-49a G.W. Finlayson
- 74-F-50 Mrs. M. Robinson
- 74-F-51 J.E. Johnson
- 74-F-52 N. Neilson
- 74-F-53 J. Bergveld
- 74-F-53a J. Bergveld

74-F-54 P. Weinrich
74-F-55 L.E. Dorland
74-F-56 D.J. Dorland
74-F-57 D.C. Hoskin
74-F-58 E. Ross
74-F-59 Mrs. E.M. Corkery
74-F-59a Mrs. E.M. Corkery
74-F-60 W.A. Hills
74-F-61 W. Highfield
74-F-62 D. Fraser & B. Fraser
74-F-63 A.R. Bebee
74-F-63a A.R. Bebee
74-F-63b A.R. Bebee
74-F-64 D.T. White
74-F-64a D.T. White
74-F-65 M. David
74-F-66 R.J. Schroder
74-F-67 M. Irwin
74-F-68 Brookdale-Kingsway Ltd.
74-F-68a Brookdale-Kingsway Ltd.
74-F-69 R.A. Elliott
74-F-70 S. Broll
74-F-71 R. Broll
74-F-72 H. Macdonald
74-F-73 M.L. Sawyer
74-F-74 S.M. Sawyer

74-F-75 M. Frew, R. McDerment & E. Patrzek

74-F-75a-Exhibits submitted on behalf of Mr. Frew, R. McDerment &
75d E. Patrzek:

- a) "Economics of Flue-Cured Tobacco Production in Ontario"
(Ministry of Agriculture and Food, Economics Branch,
April, 1974)
- b) "1973 Annual Report: The Ontario Flue-Cured Tobacco
Growers' Marketing Board"
- c) "Flue-Cured Tobacco Soil Survey", (Department of Soils
Science, Ontario Agricultural College, 29/10/63)
- d) "Electrostatic Induction from a 230 kV Transmission Line
at a Bowmanville Area Tobacco Farm" (Ontario Hydro Research
Division Report, 4/1/63)

74-F-76 Mrs. P. Lawson

74-F-77 A.J. O'Brien

74-F-77a A.J. O'Brien

74-F-78 P. De Jong

74-F-79 E.P. Morris

74-F-80 Mrs. W. van der Heyden

74-F-81 B.T. Hubble

74-F-82 R. Barlow

74-F-82a R. Barlow

74-F-83 B. Forsythe

74-F-83a B. Forsythe

74-F-84 H.S. Elliott

74-F-85 H.J. Knowles

74-F-85a H.J. Knowles - Jarvis, Blott, Fejer, Pepino

74-F-86 B. Carr

74-F-86a B. Carr

74-F-87 S. de Montmollin

74-F-88 Mrs. J. Whitfield

74-F-89 B. Guenther & R. Guenther
74-F-90 B. Currelly
74-F-91 M. Currelly
74-F-92 Rev. A.T. Lawson
74-F-93 F.J. Plumb
74-F-94 F.S. Wheeler
74-F-95 R.S. Hart
74-F-96 C. Teleki
74-F-97 J. Whitfield
74-F-98 D. McComb
74-F-99 Boleslaw Mikalski
*74-F-100 Lars Carlson and 8 Local Residents (see Exhibit 74-F-105)
74-F-101 Everett C. Lake & J. Roger Yates
74-F-102 Clarence & Dora Nichols
74-F-103 Donald Budd
74-F-104 Mrs. Mary Worrall and H. Worrall
*74-F-105 Lars Carlson (see File 74-F-100)
74-F-106 Ken Lyle
74-F-107 Mrs. Aileen Bairstow
74-F-108 J.L. Beatty
74-F-109 Ruluf Bebee
74-F-110 Donald Budd
74-F-111 James A. Hallowell
74-F-111a James A. Hallowell
74-F-112 Miss R.I. Hayden
74-F-113 Barry P. Hayes, Jr.

74-F-114 Arthur R. Kilgour
74-F-115 W. Krohn - diagram
74-F-116 Everett & Jacqueline Lake
74-F-117 Mr. & Mrs. Peter M. Lake
74-F-118 Mrs. Frank Lane
74-F-119 Mrs. John Layng
74-F-120 E.R. Lovekin
74-F-121 J. Stuart MacKay
74-F-121a J. Stuart MacKay
74-F-122 Charles F. McCaw
74-F-123 Roy & Doreen McHolm
74-F-124 M. McHolm
74-F-124a M. McHolm
74-F-125 Mr. & Mrs. Clarence Nichols
74-F-125a Mr. & Mrs. Clarence Nichols (see 74-F-102)
74-F-126 Joseph Pokusa
74-F-127 George Stapleton
74-F-128 Carol & Glenn Thompson
74-F-129 L.S. Thompson
74-F-130 S.A. Welch
74-F-131 Don Welsh
74-F-132 Mr. & Mrs. M.J. White
74-F-133 Mr. & Mrs. Harry Worrall

74-H Solandt Commission

- 74-H-1 An Evaluation of Alternate Routes for the Solandt Commission's Public Inquiry into the Transmission of Power between Lennox and Oshawa by Tom W. Sparling
- 74-H-2 Tabulation - CAI/Hydro - Lennox-Oshawa, Cataraqui-Hinchinbrooke-Keller Bridge - Oshawa, prepared by Ontario Hydro and T.W. Sparling on the feasibility of the Gatineau Right-of-Way for November 26/74
- 74-H-3 Ganaraska Region Conservation Authority Nov. 27/74, Roy Forrester, panelist
- 74-H-4 Presentation to the Solandt Commission re. Lennox-Oshawa 500 kV Right-of-Way - Impact on Ganaraska Forest Area, Douglas C. Sadler, Nov. 1974
- 74-H-5 Comments of C.H.D. Clarke on the proposed Lennox-Oshawa 500 kV Transmission Line through the Ganaraska Forest, submitted as summary after panel discussion in Port Hope 27/11/74
- 74-H-6 Gatineau Right-of-Way Feasibility - Present Land Use - maps in 3 sections
a) eastern section - North Channel - Harrowsmith
b) Hinchinbrooke - Cooper (central section)
c) western section - Enniskillen - Keller Bridge prepared by Ontario Hydro for T.W. Sparling
d) Chart of Colour significance on Exhibits 74-H-6&7
- 74-H-7 Gatineau Right-of-Way Feasibility Soil Capability - maps in 3 sections
a) eastern section - North Channel - Harrowsmith
b) central section - Hinchinbrooke - Cooper
c) western section - Enniskillen - Keller Bridge prepared by Ontario Hydro, J. Sedgwick for T.W. Sparling
- 74-H-8 Gatineau Right-of-Way Feasibility Surface Hydrology - maps in 3 sections
a) eastern section - North Channel - Harrowsmith
b) central section - Hinchinbrooke - Cooper
c) western section - Enniskillen - Keller Bridge prepared by Ontario Hydro, J. Sedgwick for T.W. Sparling
- 74-H-9 Comments of Dean Vidar Nordin on the proposed Lennox-Oshawa 500 kV Transmission Line through the Ganaraska Forest, submitted as summary after panel discussion in Port Hope 27/11/74

